URBAN PERMEABILITY

LINKING THE MARKET AND THE CITY THROUGH THE PUBLIC SPACE

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A tebo mi compañero y soporte en cada paso y a mi familia por la fuerza de sus palabras a pesar de la distancia.

ABSTRACT

The public space is the stage in which the relations between the inhabitants are developed. It is important that the relationship between buildings whether public or private and the city is a permeable transition as it is in this public space in which urban life is promoted. The main goal of this thesis is to reflect on the permeability between buildings and the city. In this context, as a tool for the research it has been chosen the main topic of the Contemporary Project Master, markets; from where the hypothesis has been developed: The market is a public facility of the city in which necessary and optional activities are developed. The permeability of the market with the city's urban tissue stimulates the social interaction of the inhabitants through the variety of activities. In this research are used the concepts of permeability and its main features as porosity, viscosity and pressure to be applied in the architectural field and define urban permeability. Then, through an exploration about maps and their intention to communicate, it has been established a way to represent the mentioned urban permeability in a graphic method to reflect how the space is linked to the city and how the inhabitants use it. Given the background, the above concepts are applied in a case study with the purpose of illustrating and understanding the urban permeability in a project in Barcelona that although it is privately owned, has a collective character in its utility. Finally, it is presented the project of the public space developed through the research which links the Galvany Market with the urban fabric of the neighborhood to which it belongs, Sant Gervasi-Galvany.

Key words: urban permeability, public space, collective space, market, public facility.

CONTENTS

1. INTRODUCTION

The city is the platform of the urban life, but it is the public space the stage where the inhabitants relate. It is important that the relationship between the building, whether public or private, and the public space is a permeable transition, which allows the easy flow of the inhabitants and invites them to move freely. When reflecting on this building-city transition, one must think of interesting edges for people, as Gehl mentions, it is the soft edges[1] that promote life in the city; therefore, the design of the ground floor level is transcendental in the urban life. "City life is a matter of quantity and quality, density alone does not necessarily produce life in the streets"[2]; if we want a city where activity happens, is not only about the amount of people living in it, but the quality and variety of options the city offer.

The public space is where social get-togethers take place and the quality of urban life of the inhabitants improves, it enhances the life in the city, generating social cohesion, safety for the city, and influences the functions and uses of buildings, structuring the city life itself. It is important that the public spaces in the city are spaces with high levels of inclusiveness and that perform as magnets to keep the city active at several hours of the day, thus increasing safety and improving the city's experience.

City facilities such as markets are also public spaces with activities of importance in the daily lives of the people. These are facilities in which both optional and necessary activities[3] are carried out, therefore they foster social interrelation and structure the life of the city. The integration of the facilities of the city with the environment is fundamental for their correct functioning, so that they fulfill their purpose with totality, accomplishing its functions as they were designed. This is why permeability[4] is an important aspect in the city and its urban fabric; the place where the city and the building meet must be of quality with a variety of activities and opportunities for the people to

1 Gehl, J., 1986. *"Soft Edges" in Residential Streets.* Scandinavian Housing and Planning Research, I(3), pp.89-102.

2 Gehl, J. & Rogers, R., 2013. *Cities for people.* Washington: Island Press, p.68.

3 "In general, public space activities can be divided into two categories: necessary and optional. Necessary activities could include shopping, walking to and from a bus stop, or working as a parking enforcement attendant, police officer or postman. Optional activities comprise strolling or jogging, sitting on a stair step, chair or bench to rest, reading the newspaper, or simply enjoying life while walking around or seated. Activities that are necessary for some people may be freely chosen by others." Gehl, J. & Svarre, B., 2013. *How to Study Public Life.* Washington: Island Press, p.17.

4 See definition of permeability in section 1.4

use it and live the city. As city designers we must seek the right degree of freedom of movement of the inhabitants so that they can develop the appropriation sense of their city and the social encounter happen.

The hypothesis of this TFM is: the market is a public facility of the city in which necessary and optional activities are developed. The permeability of the market with the city's urban tissue stimulates social interaction of the inhabitants through the variety of activities. Thus, the main objective is to study the permeability taking as an example a market and its context; the Galvany Market, and develop a project in the public space around the market in order to integrate it with the context. In this perspective this master's final project is structured in three main chapters that will allow the development of this work.

The first chapter is the theoretical framework, which include the study of public and collective space, the importance of the ground floor level, permeable city and finally the concepts of permeability are adapted interpreted for the aim of this work, which is to link the Galvany Market with the urban tissue. After this conceptualization, the second chapter is developed around the necessity of understanding and analyzing the permeability; this chapter includes a brief research about different types of maps which are different from the geographical maps since the permeability is more a matter of sensations and perceptions rather than an exact data. Also in order to deep in how the permeability works in one real and built project, in this chapter a case study will be analyzed, in this instance is L'illa Diagonal Shopping Center, a project located in Barcelona, which is the same city of the design project of this work. This analysis will be carried out with the concepts obtained from the first chapter and with the punctual approach of this work, permeability. Finally, this master's final project will conclude with a design exercise of the the public space which will link the Galvany Market with the Sant Gervasi-Galvany neighborhood; therefore the third chapter will include the understanding of the markets as a public space in the city with a deeper emphasis in Barcelona; afterwards it will be carried out the analysis of the context in order to comprehend the neighborhood to develop the project. This chapter will include the maps of permeability and the architectural plans of the proposal. Lastly the master's final project is completed with the conclusions found along the process and the recommendations for possible future research.

URBAN PERMEABILITY

This chapter presents the theoretical framework on which the research of this work is based, and will provide the reader with an idea of what is going to be treated. The concepts used in the investigation will be found starting with the definition of public and collective space, the importance of the activities in the ground floor to maintain the vitality of the city, the permeable city and finally the urban permeability. With this chapter you will be able to understand clearly the development of this master's final project.

Cover image of the chapter: Pattinatori (1953)
Source: Mario De Biasi (italian photographer)

2.1 PUBLIC SPACE AND COLLECTIVE SPACE

Public space is a fundamental element in urban life, it is the core of the city and to improve the city is important to recognize the right the inhabitants have on it, only in this way the public space makes sense and develops its function (figure 01). Within the public space we can understand the city, its inhabitants and stories[1] because is where the meetings happen. The collective space (figure 02) is the meeting point of the city, therefore streets, squares and other spaces are the starting point to design cities[2]. As Solá-Morales suggested we should think about collective spaces which go beyond public space by it means, these are public spaces that are used for private activities or private spaces of collective use[3], in this way he proposes to expand the concept of public space to include new spaces such as commercial places, parking, etc.; he adds "these are public spaces that are used for private activities, or private spaces that allow for collective use, and they include the whole spectrum in between"[4].

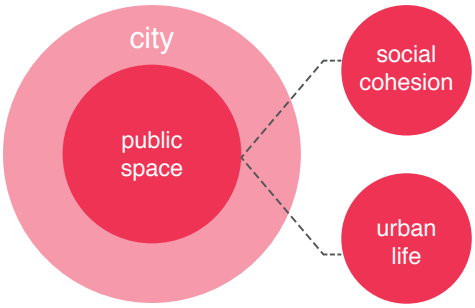

Figure 01. Public space as core of the city.

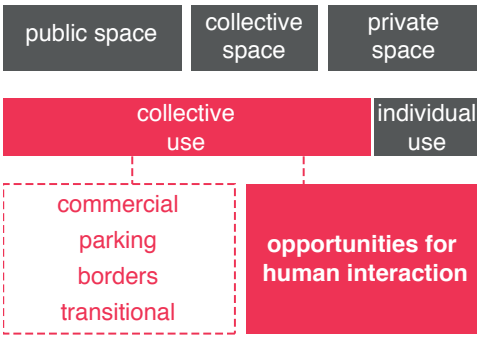

Figure 02. Reframing collective space. Source: Kris Scheerlinck

1 "Del ágora a la plaza de las manifestaciones políticas multitudinarias del siglo XX, es a partir de estos espacios que se puede relatar, comprender la historia de una ciudad" (From the agora to the square of the multitudinous political demonstrations of the twentieth century, it is from these spaces that you can relate, understand the history of a city) Translated by author. Borja, J. & Muxi, Z., 2000. *El espacio público, ciudad y ciudadanía.* Barcelona, p.7

2 Ibid, p.13.
Original quote in spanish: "En la ciudad lo primero son las calles y plazas, los espacios colectivos, sólo después vendrán los edificios y las vías".

3 Originally quoted in Scheerlinck, K., 2010. *Depth Configurations. Proximity, Permeability and Territorial Boundaries in Urban Projects.* Barcelona: Universitat Ramon Llull.

4 ibid.

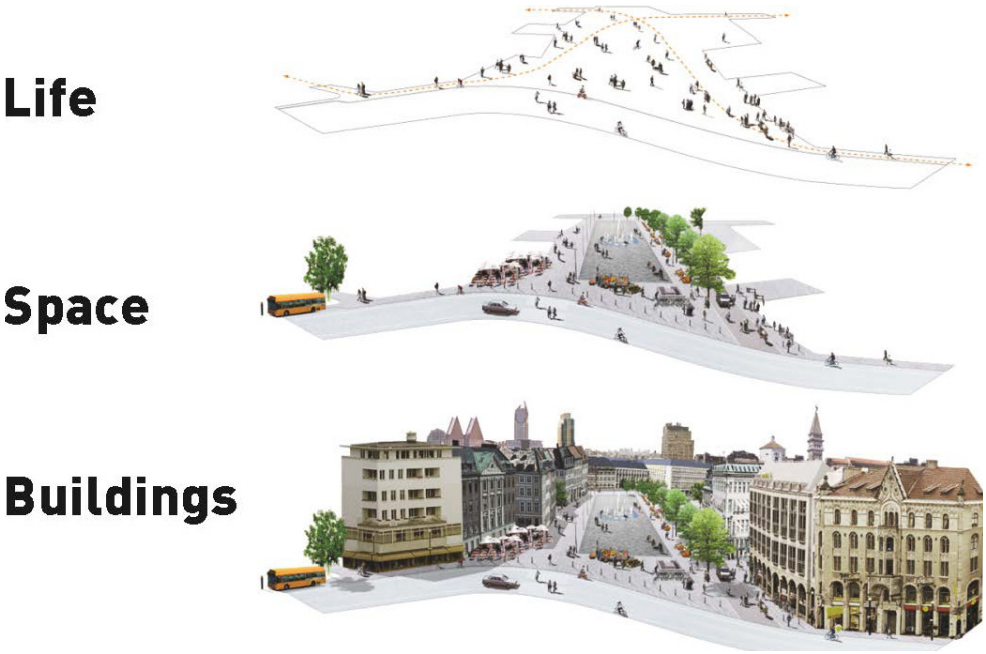

Figure 03. The different levels of the city. Source: Jan Gehl.

In addition, Borja & Muxí[5] make a special consideration and propose to think about transitional spaces, that is, those between the private and the public, which Jan Gehl refers to as soft edges[6]. These zones can be seen as opportunities to expand the possibilities of creating quality public spaces, whether permanent or ephemeral and they can be shared by a few or by many people.

The collective spaces then include private and public properties but the key is access, the multiplicity and the tolerance of its use its essential, they "start in the most accessible part of the open space until the last part of the urban sequence that is shared or vice versa"[7], theses spaces should be seen as a whole because they are somehow the boundary without restriction or the ambiguous property where the people interact the most and experience the urban/city life. Therefore we must reflect on exploiting these collective spaces, transitional or soft edges to create connections between public, private and any type of building and the city (figure 03); in this way the buildings do not function as isolated elements but are connected and immersed in the city and people can move through them with a pedestrian flow that contributes to the best functioning of the city similar to a fluid that is irrigated on a surface and extends where its needs predict, changing course when it encounters some obstacle but seeks to follow his path.

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5 Borja, J. & Muxi, Z., 2000. *El espacio público, ciudad y ciudadanía*. Barcelona, p.41.

6 Gehl, J., 1986. *"Soft Edges" in Residential Streets*. Scandinavian Housing and Planning Research, I(3), pp.89-102.

7 Scheerlinck, K., 2013. *Collective Spaces Streetscape Territories*. Ghent, Brussels: Dag Boutsen, p. 7. It should be understood that collective space is not only a fancier word to name the public space but is different, it includes different shades of individual and collective space and also public or private ownership.

2.2 THE IMPORTANCE OF THE GROUND FLOOR ACTIVITY

"What we need to do is encourage and insist on freedom of movement for pedestrians in their own city…. And ground-floor architecture plays a key role in this context as well"[8]. Instead of creating self-absorbed and impermeable buildings the city should have open spaces with variety, versatility and opportunities for the people to use and to improve their urban life making the city safer. It is important that buildings and facilities are mixed into the city and to accomplish this the treatment of the ground floor is essential. The ground floor[9] is the transition space between buildings and city spaces, they can be areas where a variety of activities such as recreation, exhibition, rest, play, exchange, etc. are developed, increasing chances for the citizens and enhancing their quality of life. It is important that the activities that happen in the ground floor are thought for the pedestrians as the main actors, the greater variety of activities, the greater the wealth of the pedestrian experience. "If the ground floors are interesting and varied, the urban environment is inviting and enriching. If the ground floors are closed or lacking in detail, the urban experience is correspondingly flat and impersonal"[10]. A façade in the ground floor that is continuous and without openings is a space in which people do not stop but only circulate, therefore do not remain in the public space, use it as a place of circulation; however if you have active borders with small spaces on a human scale people will stop or slow down making use of the city[11]. In this context, the ground floor, where building and city meets should be re-evaluated and improved for the people, adding activities and opportunities for all users to improve the neighborhood and city life, because 'people attract people'. As architects what we should aim is the freedom of movement for pedestrians in their own city and for this the ground floor plays a key role, the buildings and city spaces should be treated as a whole and invite the users with a welcoming space which promotes close encounters (figure 04).

8 Gehl, J., Joahnsen, L. & Reigstad, S., 2006. *Close encounters with buildings*. Urban Design International, (11), p 39.

9 The ground floor is the opportunity to have a better relationship between the building and the city, it is part of the collective space it has been mentioned above.

10 Karssenberg, H., Laven, J., Glaser, M. & van t Hoff, M., 2016. *The city at eye level*. Delft: Eburon Academic Publishers, p. 35.

11 Jan Gehl refers to this spaces as the architecture of 60km/h vs the architecture of the 5km/h.

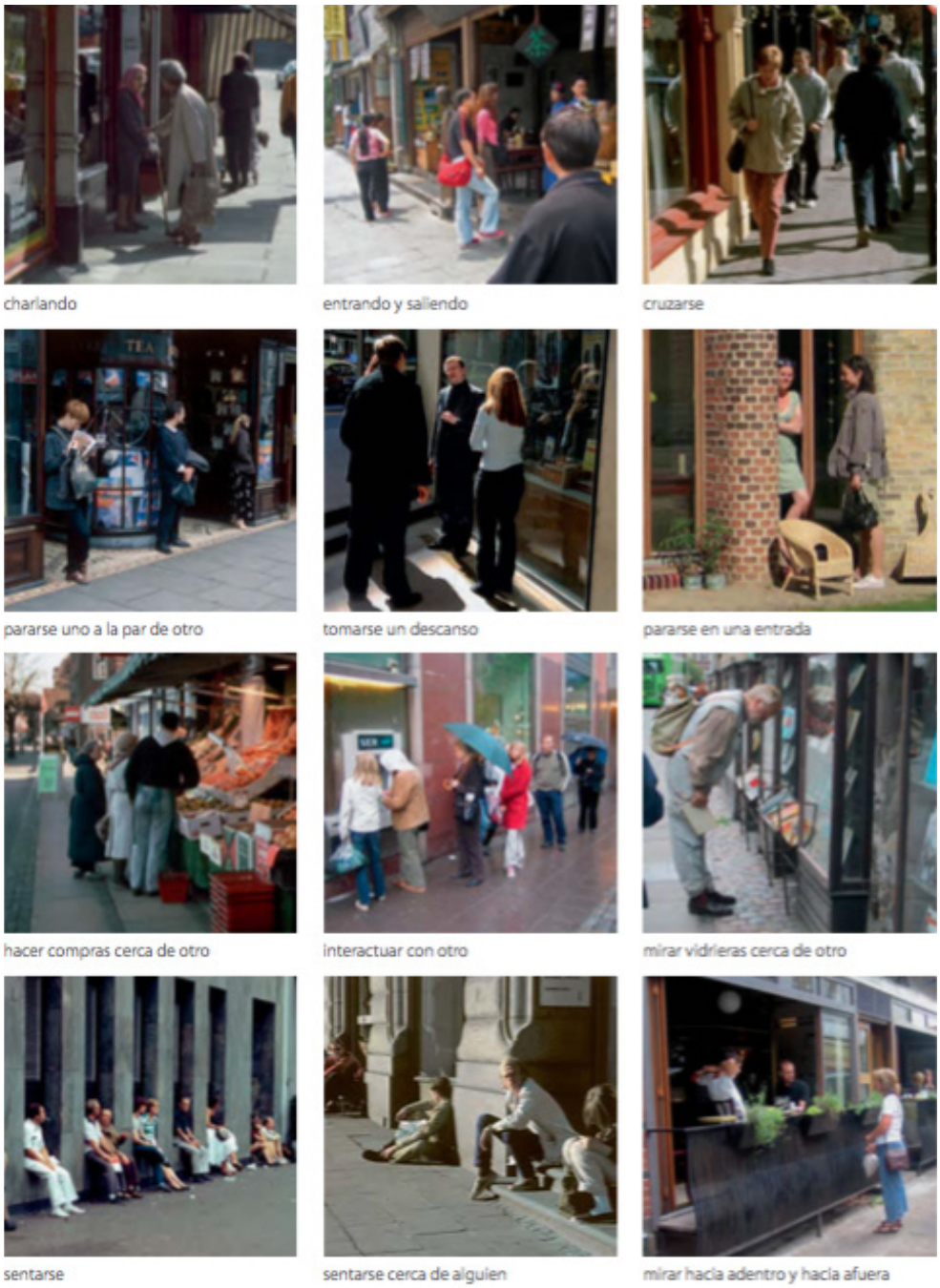


Figure 04. Soft edges, where the building meets the city. Source: Cities for people.

The image shown above is part of Cities for People's chapter called *A lively, safe sustainable and healthy city,* in which Jan Gehl describes how the quantity and quality of the activities the city offers affects the pedestrian flow and the speed at which the people moves at different hours of the day.

These are some of the activities which should be promoted in the ground floor activity to act as soft edges or transitional spaces in order to keep the city alive at most hours acting as forces to keep the people in the public space for an extended period of time rather than just while circulating as a neccesary activity. These activities are the opportunities to which the inhabitants should be exposed to achieve the liveness of the neighborhoods and therefore in the city.

2.3 PERMEABLE CITY

The city is where the urban activities are developed, where the interaction is promoted which improves the quality of life of the inhabitants; this built environment must enhance the opportunities maximizing the degree of options for its use. The quality of life of citizens depends on social and economic factors as well as environmental and physical-space conditions[12]. If the quality of life of the inhabitants is sought to be satisfactory, it is necessary to create spaces in which the inhabitants could and would want to spend their time as a part of they daily routine. As Gehl[13] suggests a healthy, livable and safe city, it is the city that takes into account the citizen as a center and the public space as a priority area of the city; this leads to the encounters between the citizens in the public space. This space is public when people can freely use it without restrictions, when it is a permeable place with several possibilities of routes and access for every type of user.

This permeability which in this work will be called urban permeability is essential for the success of the public space and therefore of the city; because it allows the ideal relationship between public and private space, which can not work independently but complementarily to enrich the experience of the city. "The quality of permeability can play a major role in order to make people more responsive towards their users"[14], in the city is necessary to think how the permeability affects and effects the space; the right degree of permeability can enhance the public life.

In this context, a city should be permeable but it should have control in order to satisfy all the citizens needs. By this I refer to create spaces which are accessible but not completely permeable because that would mean to have spaces without any control or boundaries; when the spaces needed are different in every context, function and activity.

For example, the relationship between a house and the sidewalk is different from

12 Original quote "La calidad de vida de los ciudadanos depende de factores sociales y económicos y también de las condiciones ambientales y físico-espaciales". Translated by author. Rueda, S., 1996. *La ciudad compacta y diversa frente a la conurbación difusa.* In Ministerio de Obras Públicas, T.y.M.A. Primer catálogo español de buenas prácticas. Madrid: Ministerio de Obras Públicas, Transportes y Medio Ambiente.

13 Gehl, J. & Rogers, R., 2013. *Cities for people.* Washington: Island Press.

14 El Hosseiny, O., n.d. *Permeability. A key mesure for responsiveness in urban design. Case study of Cairo C.B.D.* [Online] Available at: http://www.cpas-egypt.com/pdf/Omar%20El%20Hosseiny/009.pdf [Accessed 16 May 2017].

Figure 06. Santa Caterina Market. Source: Luigi Nifosi

a public facility and a side walk. In the first case, the permeability should be achieved with a certain control in order to have the contact between the public and the private but without creating dangerous situations or exposing the people; if the relation is right, the city would benefit from it. As Jane Jacobs refers to the eyes on the street[15], which means that if the inhabitants of a neighborhood would keep alert on the activity happening on the street, this would be a much more safe place since it adds security and surveillance to the city; this is the permeability between the public and private (figure 05) and with some actions to control the permeability degree permeability it can create a successful model of relation between public and private spaces, as Ian Bentley mentions in his thoughts about responsible environments, "public and private places cannot work independently.. They are complementary, and people need access across the interface between them. Indeed, this interplay between public and private gives people another major source of richness and choice"[16]. But in the second case, the relation between the public space and the public facilities should have a higher connection increased by the permeability in the public space.

If we realize that even though the side walk and the public facility are different type of spaces, they are both public where public life happens, so the boundaries should not be as strong as the first case (house and sidewalk), this relation should improve the encounter between the people, promote the activities to happen and let the pedestrian flow as needed (figure 06).

In this context, a permeable city must be pursued, with strong relationships between the spaces that create it. These relations must have the level of permeability which promote benefits for the city and the life of its inhabitants; with inclusive spaces, increasing activities and making the city a better, safer and pleasing place to be.

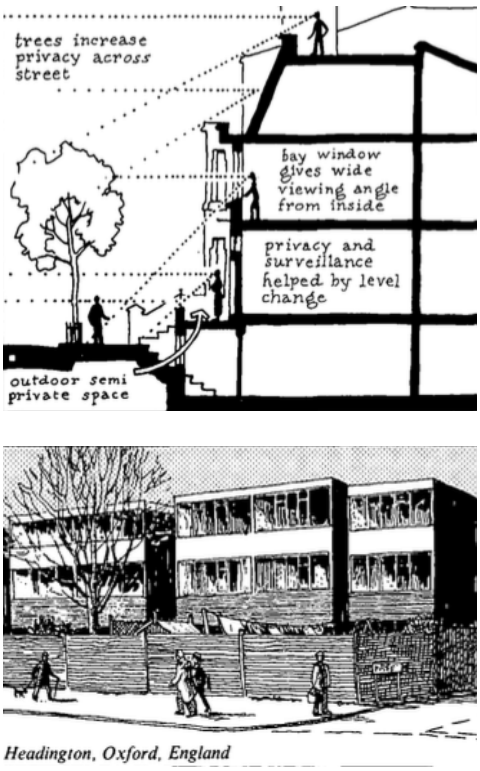


Figure 05. Visual permeability. Source: Ian Bentley.

15 Jacobs, J., 1961. *The Death and Life of Great American Cities*. New York: Random House.

16 Bentley, I. et al., 1985. *Responsive Environments*. Burlington: Architectural Press.

2.4 URBAN PERMEABILITY

It is necessary to understand the epistemological definition of permeability in order to continue with this matter in this work. Permeability[17] refers to the ability of a material to allow a flow to pass through without altering its internal structure; is the rate at which a pressurized liquid passes through a porous and is the ability to permit such flow. There are three features that influence the rate at which the fluid passes through the material in permeability, these are the porosity of the material and its structure, the viscosity and the pressure to which it is subjected[18].

If we reflect on this concept and translate it into the city we can talk about the urban permeability, which is this master's work topic and in which the next pages will be developed around. If we think on the permeability we can identify that a similar phenomenon happens in the city; a fluid moves around a material and tries to make its way through it. I am talking about the people, the pedestrian flow which acts as the fluid in the city, moving around from one place to another. If we see it this way, the membrane the membrane that allows the course of the flow in the city is the public space[19] and it is the same one that relates the buildings to the environment. Thus this public space must be the link which allows the inhabitants to move through the urban tissue and its buildings, between the public and private spaces with a quality experience, giving importance to the structure of the context and the function of the buildings around it. Humans are in a constant movement, from home to work, to school, to the park, to the market, etc. and this movement we do it in the city so the spaces must be permeable to allow it to happen.

It is also necessary to think that relationships in the city require types of permeability, as Ian Bentley[20] suggests, physical access to the private is often limited, but visual permeability can enrich the public space, of course depends on the context in which used, for example from a sidewalk does not need to see the bathroom of a house but if we walk looking at a vitrine, we are probably drawn to stop.

17 Real Academia Española, 2014. *Diccionario de la lengua española*. [Online] Available at: http://dle.rae.es/?w=diccionario [Accessed 14 February 2017].

18 Daily, J.W. & Harleman, D.R.F., 1975. *Dinámica de los fluidos con aplicaciones en ingenieria*. México: Trillas.

19 Transitional space, collective space, soft edges

20 In (Bentley et al., 1985) there is a section where they discuss about the permeability between the public and the private space.

2.4.1 POROSITY

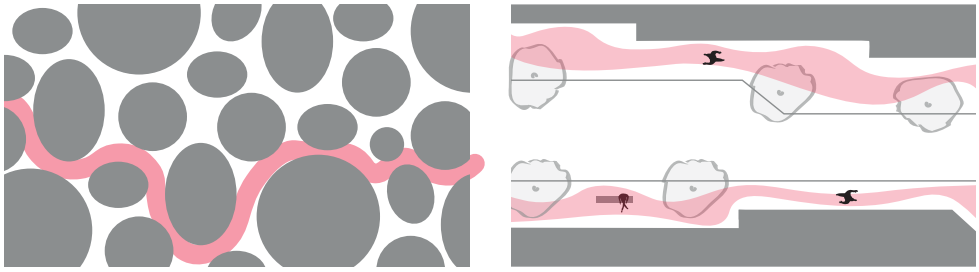


Figure 07. Porosity and urban porosity.

The first feature which influence the permeability is porosity (figure 07), which is the measure of void spaces in a material between its molecules[21]. It can be considered as the relation of the empty space in the total volume. The pores are the holes which let the fluid pass through the material, the more quantity of pores in a material the higher the porosity, which leads in the more amount of fluid to pass.

If we relate this concept to the public space in the city, the porosity is a measure which involves the space of free movement of the people, it is affected by many factors such as the disposition of the elements which block the transit of people or by the elements which restrict the access to a certain place. It is important to understand that the porosity allows the pedestrian flow to move but only if combined with the other features (viscosity and pressure) the space completes its function, because we don't seek to create spaces only for circulation but also interesting spaces which invite the users to stay and interact. Claudio Coletta[22] refers to porosity as a continuous exchange between the public and private realm, which has the power to describe the experience between the people and the public space. It is worth to mention that the "pores are not simply openings – they are more like 'intelligent' filters, constantly at work and alert"[23], therefore the porous degree will affect the experience of the space and the degree of permeability it has.

21 Daily, J.W. & Harleman, D.R.F., 1975. *Dinámica de los fluidos con aplicaciones en ingenieria*. México: Trillas.

22 Coletta, C., 2016. *Urban Plots, Organizing Cities*. Taylor & Francis.

23 Ibid, p.43.

2.4.2 VISCOSITY

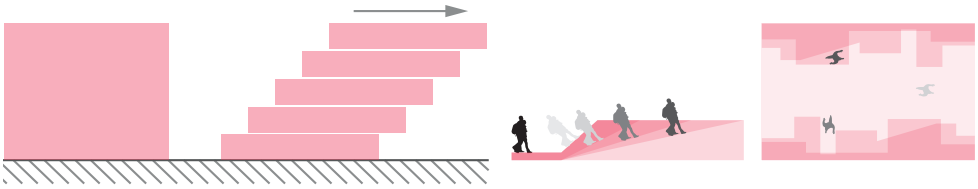


Figure 08. Viscosity and urban viscosity.

Viscosity (figure 08) is the second feature which influence the permeability and as the epistemological definition says it is a physical property of materials that emerges from collisions of fluid particles that will move at different speeds, causing a resistance to movement[24]. A fluid with low viscosity such as water flows easily because the molecular fiction is inferior compared with a higher viscosity fluid like honey which moves significantly slower due to its composition.

Taking in account that the fluid in the urban permeability is considered the people, the viscosity will be the collision of the human flow with the space causing a resistance. It is related in the public space with the presence of the topographic variation and the elements used to save these changes of level like steps and ramps. Also the collision happens when there is a complexity in the built environment, with elements which alter the linear movement of the people and create a sort of labyrinth in the space forcing them to make a turn or a movement in a different way.

Although an ideal fluid is considered to the fluid with no viscosity in the city and the public space is different. A space with no viscosity could end up in a linear and monotonous place which clearly reduces the attractiveness for the people. Therefore, viscosity should be present in the design of the space to create interesting environments which keep the users active and alert of what is going to happen; also the layout in the plans could guide the flow as necessary or desired. If the viscosity of a fluid is too great, the friction between the layers would be too; which means that they could not move, in the same way in public space, if the slopes of the routes exceed those needed, people would not choose this route because of its inability to move through it.

24 Real Academia Española, 2014. *Diccionario de la lengua española*. [Online] Available at: http://dle.rae.es/?w=diccionario [Accessed 14 February 2017].

2.4.3 PRESSURE

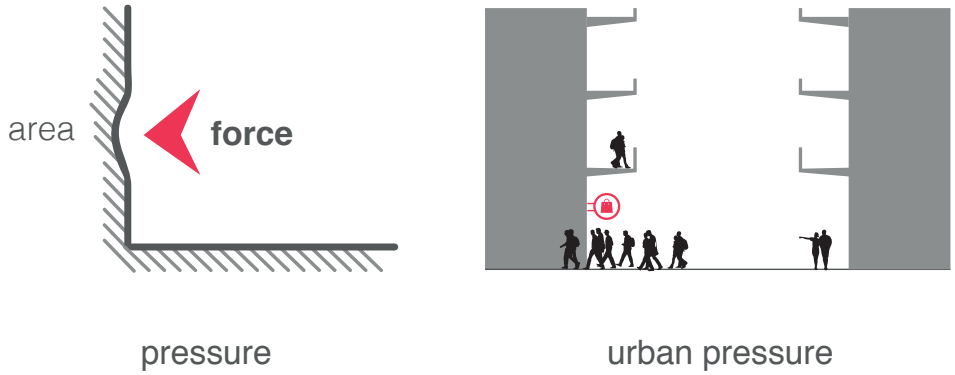


Figure 09. Pressure and urban pressure.

Finally, the last feature which influence in permeability is pressure (figure 09). The concept of pressure refers to the result of compressing or squeezing something; it is a physical magnitude that measures the projection of a force in a perpendicular direction per unit area, that is, when the fluid is forced through the membrane[25]. In case of the urban permeability, we must reflect on what forces the fluid (people) to move through the membrane. Among other factors, the variety of activities is what invites and forces the users to move, it could be compared to a magnet which pulls the people to where desired. The variety of uses then is the force which attract the people and keep the space active and dynamic. Therefore, the importance of the variety of uses in the ground floor is essential in the design of the public realm creating as what Jan Gehl refers to soft and active edges in the city, which are the link in the buildings to the public space. This edges are also vital to keep the public space alive, since the activities which they promote are could expand and make use of the public realm, making the people appropriate of the space and use it as their needs make them to.

25 Georgia State University, 2000. *Index to Hyperphisics*. [Online] Available at: http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html [Accessed 13 May 2017].

Accessible spaces for the people in the city are those that offer activities for the people to happen and the interactions between them as well. If these spaces were totally permeable, there would not be any privacy, and in the private space such as housing the privacy is required. One can then think of the level of permeability or the type of permeability required, as is the case of a clothing store in which the front window must be visually permeable to attract and display its products at the same time as the access will be permeable physically for clients to enter. However, the relationship between public and private space and between public facilities and public space is a matter that must be considered when designing the contemporary project, since it is in this link where the city experiences can be improved. Although urban permeability improves the public space experience, it is necessary that all three components are present in the public space. It should not be sought for spaces that are permeable in their totality, but spaces which let pass the right flow of people and that promote the encounters to happen between them. That is why all components are essential to create a permeable public space. Porosity is necessary to promote pedestrian flow but is also necessary to stop it and create the mentioned relationships. Viscosity is responsible for causing interest for users, that friction it creates is what helps the space to be interesting, with breaks and ups and downs that maintain the effect of a surprise or doubt of what is coming next in the space. Finally, the pressure helps the public space to be alive, offering people a variety of activities is what promotes them to stay and therefore to interact, these activities in addition to being beneficial for people, are also helpful for the city, because thanks to these activities happening at different hours and directed to a variety of users the city becomes safer while the public space is active.

MAPPING THE SITUATION

In the second chapter of this work includes a reflection on maps as a representation tool. In the previous chapter the concepts of relevance have been presented, therefore it is necessary to know how to represent them graphically. In this context, the information about the maps and their function and later representative examples that have been useful in this work are included. Finally, this chapter concludes with the application of the aforementioned in a case study, L'illa Diagonal Shopping Center. This case study is carried out in a particular way with the exposed interests of this master's final project, the urban permeability, with the purpose of enriching and understanding the concepts and to be used as a reference throughout the investigation.

Cover image of the chapter: Map of Tokyio
This image is part of an exhibition on the theme of the identity of cities and their inhabitants held in Venice in 2014. The artist intention was to represent the influence of cities on their environment as a kind of invisible fluid that overflows form the city to its surrounding.
Source: Chaotic Atmospheres

3.1 WHAT DO WE INTEND TO COMMUNICATE?

This is the first question when mapping a situation. It is from this point that decisions must be made on which resources to use and how the information should be represented. There are several options when transmitting information about a place (photographs, drawings, maps or plans), its choice depends on the author and the subject to be treated. The important thing is to reflect on the information that needs to be transmitted about this place. Although on a map there may be data on the place, it should be differentiated that the isolated data have no greater meaning, are only values or elements; but only after being interpreted will become information.

Maps can talk about different topics: space, geography, politics, etc. but that is only the topic of the map, the map language is given by the author of that map and its ability (or intention) to dispose the elements on the map. Although the problem in practical terms is how to figure spatial relations (three- dimensional) in a two-dimensional surface, the very problem is how to represent objectively the required information needed in the map in order to be accurate[26].

Well, this might not be that simple. As Monmonier states in his eloquent book How to lie with Maps: "Not only is it easy to lie with maps it's essential ...But the value of the map depends on how well its generalized geometry and generalized content reflect a chosen aspect of reality."[27] Therefore, a map does not necessarily represent the reality of a place but the intention that the author has; the maps are always selective and it is up to the author to manipulate them for their own interest or for the reader. For example, in the case of a metro map (figure 10), its objective is to effectively communicate to the user the information that will allow him to travel from one place to another. Geographic information is not as important as the abstraction that is obtained from the data, it is this graph or diagram transmitted in a clear and simple way that allows users to read it. But if we leave aside the strict geographic or cartographic information, we can find infinite ways to represent maps in a much more aesthetic way. In the book Atlas of Design, every two years are collected a series of maps with a unique vision and that transmit information that the artist has considered pertinent. Only imagination and data are needed as tools to produce images or maps in which both numerical[28] and abstract[29] maps can be represented.

26 Schlögel, K., 2007. *Im Raume lesen wir die Zeit.* 1st Spanish ed. Madrid: Ediciones Siruela.

27 Monmonier, M., 1996. *How to lie with maps.* Second edition ed. Chicago : The University of Chicago Press, p.1

28 Density, area, distance, etc.

29 Smell, tenderness, perception, feelings, etc.

Figure 10. Metro map of Barcelona. Source: Mapa Metro Barcelona NET

Figure 11. Map of truth and deception. Source: Fast Company & Inc

3.2 PREPRESENTATIVE APPROACHES

Ben Gibson's map of truth and deception can be seen in the way it represents the aesthetics of morality, at first glance it seems that a topography is drawn but actually instead shows how truth and lies are as opposite poles (figure 11). Gibson not only uses the location in the composition to separate the categories to represent but also the resource of color; he uses black and white and a range of grays to display categories in between. In addition, there are spots of light blue that represent rivers that as they do in reality breaking the land, in this are categories such as white lies or family secrets that fall into an ambiguous category.

Another example are the typographic maps, in which the context is related to some quality represented by words. There are several examples of this type of map; as an example Zachary & Betsy Jones's map show geographically referenced in a South America map the words used in each country to express the word 'cool' (figure 12). Starting with the title of the map is a matter of reflection, the authors use the word 'cool' in English to show a map of mostly Spanish speaking

Figure 12. El mapa mas cool del mundo. Source: Zachary Jones

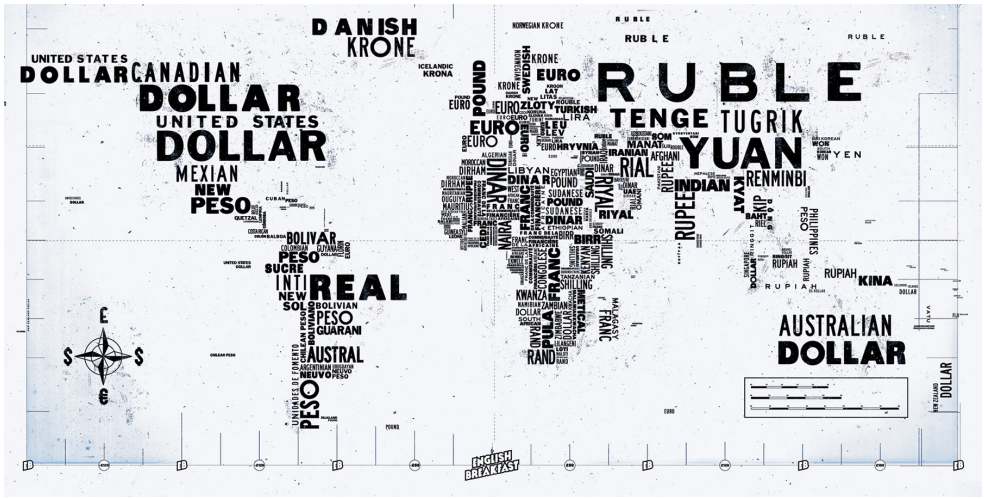


Figure 13. Wolrd currency worth. Source: Rede Brasileira de História da Geografia e Geografia Histórica.

countries. But even though in the same typographic map category the World Currency Worth map (figure 13) could be placed, it has a different layout and intention. This map shows in words the names of the currencies of the countries of the world, it is important to indicate that the author choses to create variations in order to express what he needs. As you can see although in the coolest map of the world, there are words repeated (chévere, bacan), they are all in the same size and with the same typography. In the case of the map World Currency Worth the author wanted to show which he considers the most important such as the dollar, real, yuan; increasing the size and with more intensity in the typography. These are examples of the intentions of the authors, as they express reality from their perspective with real geographical situations but under their interpretation.

However, it is not necessary to have real data like the geographical locations we have seen in the previous example; only the imagination is needed to transmit what desired; this is what David Honnorat has done in his map of The Best Movies Of All Time (figure 14), in which he represents in a subway map model what he considers the best films categorized into subway lines according to the genre to which they belong[30].

30 Lois, C., 2015. *El mapa como metáfora o la espacialización del pensamiento.* Terra Brasilis (Nova Série).

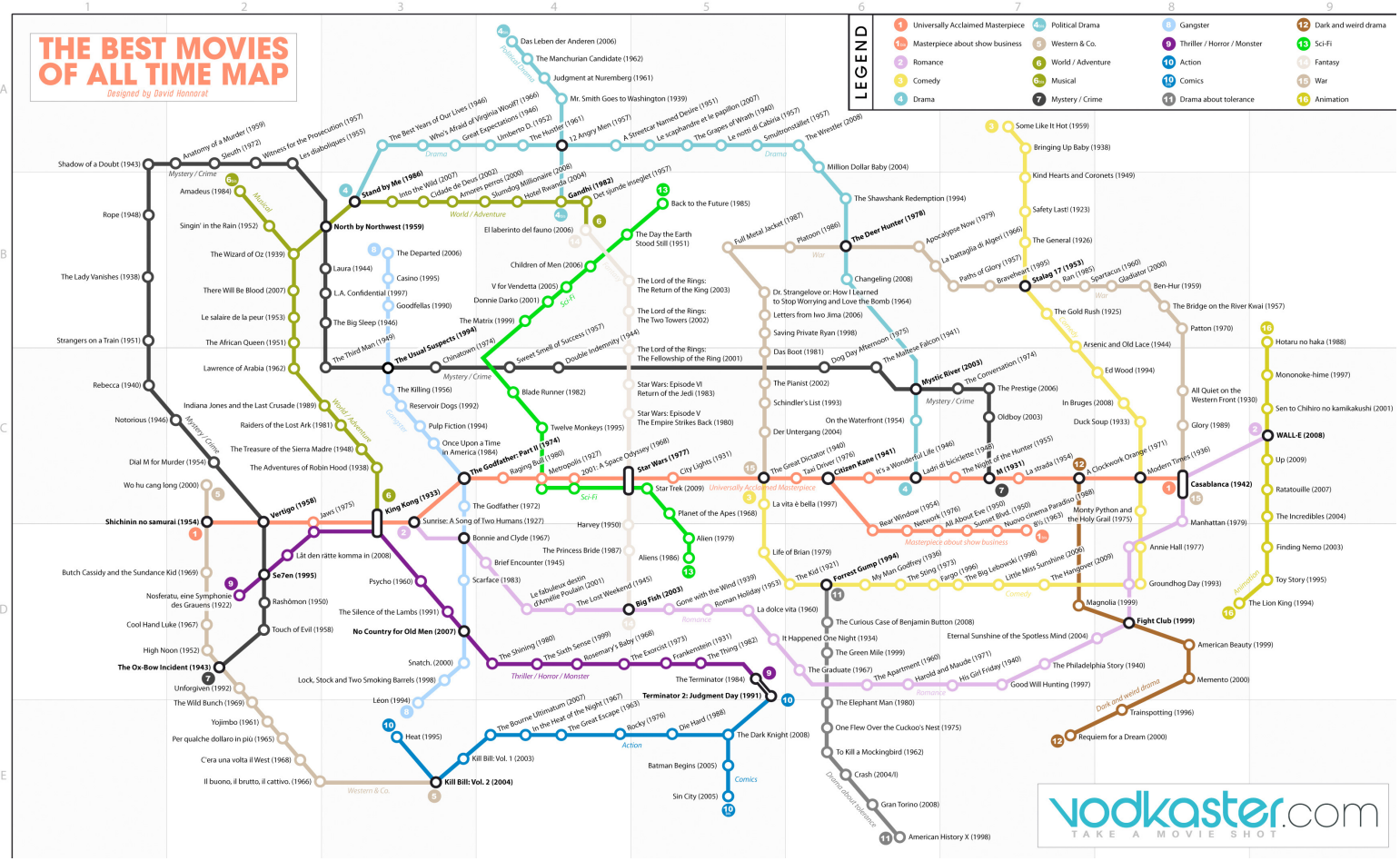


Figure 14. The best movies of all time map Source: Vodkaster.

Figure 15. New York's thresholds of smell. Source: Katy Mclean.

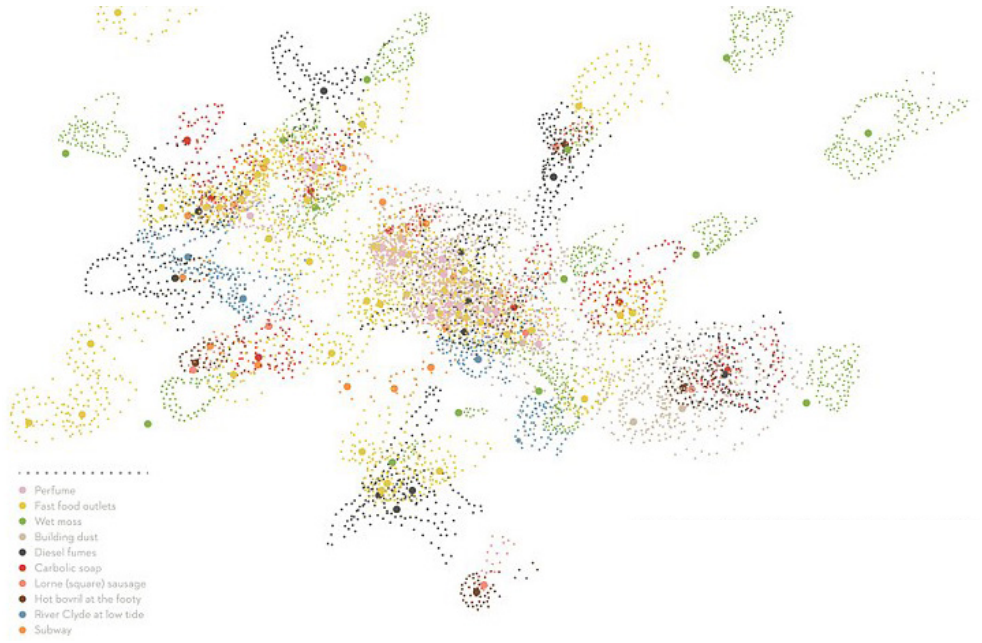


Figure 16. Scents of Glasglow.. Source: Katy Mclean.

Katy Mclean, an artist and designer creates a different type of maps which includes matters of the perception about a place or as she refers 'sensory maps of cities'. Its maps represent the scents of the city; it focuses on the human perception of the urban environment. The data is collected from her own experience in some maps but she also organizes group walks, smell sketching and uses the graphic design to capture the memories of the places in her maps. The artist considers that the smell of the city gives a deeper look in the neighborhoods as seen in the case of New York Map or Glasglow Scent Map (figure 15-16). McLean seeks to represent through maps an experience or the feeling that the place produces, and the routes are shown as the understanding of the relationship of people with the physical environment, scenario of daily routine; her technique could be

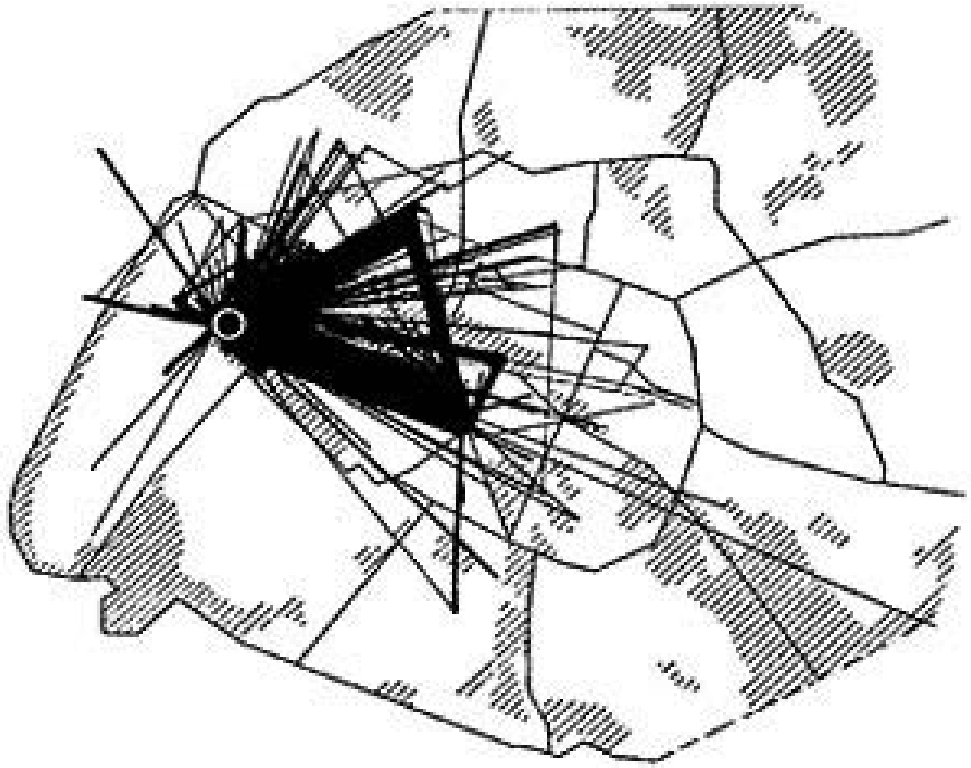


Figure 17. Paris and the Parisian agglomeration, Chombart de Lauwe, 1952. Source: Cartografía Russafa.

similar to the situationist's psychogeography[31] principles, with their revolutionary ideas of the re-elaboration of the daily life of the city, in which the maps were created adrift, starting from the knowing of the place with the perceptions obtained after.

One of the situationist's map is The map of Paris and the Parisian agglomeration (figure 17), in which it is shown the trace of the movement made by a student for one year, because Chambart de Lawe argued that the neighborhoods are determined by the representation of the inhabitants and found a way to illustrate this agglomeration through An inhabitant of Paris and her routine[32].

31 A type of cartography influenced by the emotions of the city on the individuals. The maps of the situationists are unfamiliar to the administrative boundaries and are characterized by an emotional description of space

32 Facultad de Bellas Artes de San Carlos de Valencia, 2011. *Cartografía Russafa. Mapa relacional de identidades urbanas.* [Online] Available at: https://cartografiarussafa.wordpress.com/2-los-mapas-como-experiencia/ [Accessed 17 May 2017].

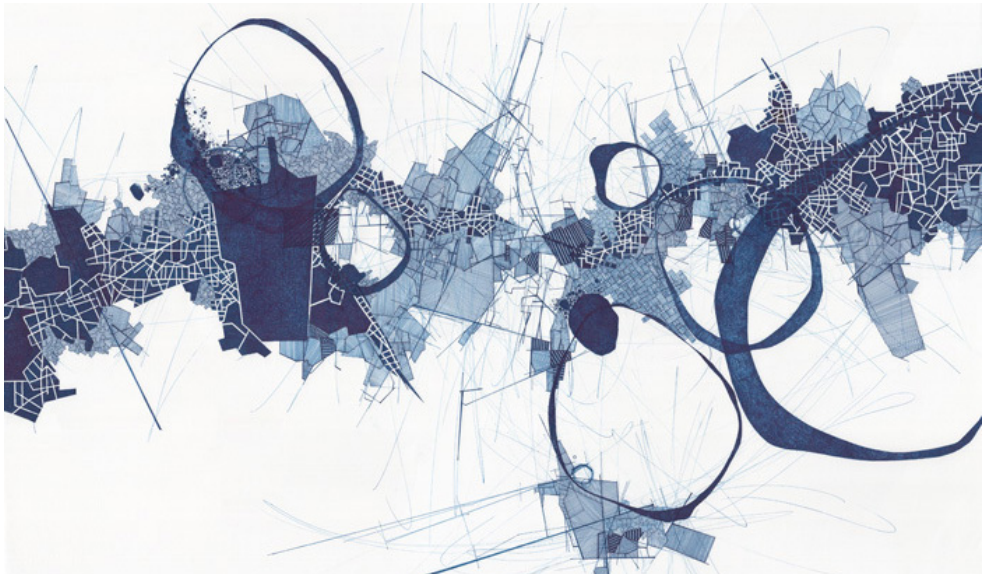


Figure 18. Avex 04 by Derek Lerner. Source: Derek Lerner.

Figure 19. Asvirus 068 by Derek Lerner. Source: Derek Lerner.

The artist Derek Lerner draws in maps the relation of the forces of the man's creation and the natural systems from an aerial point of view with a fictitious interpretation of the sum of layers of elements, symbols and signs, also with the combination of color palettes. He focuses on showing the human impact on the environment with compositions that show how destructive the human can be with their surroundings as well as the beauty they can create[33]. It also seeks to show how the elements of each composition multiply and extend to others elements by showing the complexity of systems (figure 18-19).

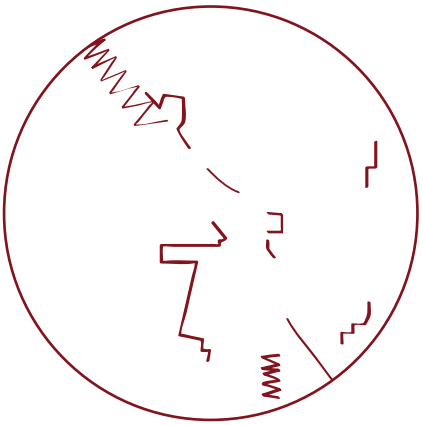
33 Robert Henry Contemporary, 2016. *Robert Henry Contemporary*. [Online] Available at: http://www.roberthenrycontemporary.com/artists/derek-lerner [Accessed 16 May 2017].

3.3 MAPPING THE PERMEABILITY

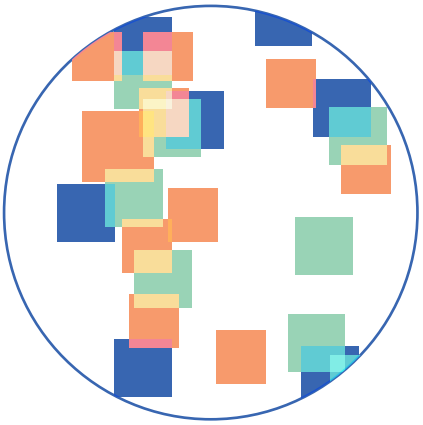
A map is a representation of the space; it projects three-dimensional spaces in a two-dimensional plane and, although in some cases it is considered that the most successful may be the most accurate maps, are the author's intentions, preferences and experiences what validate all maps. In this context we can reflect that even though the ways of communicating information can be considered infinite it depends on who wants to communicate and what information how it will look for the best way to reach the reader.

But why did I need to focus on maps for my TFM?... When I started to develop the case study of L'illa Diagonal Shopping Center -which is in the next section- I found myself developing the initial maps before focusing on this topic, and I draw maps differently where the permeability could not be identified very easily rather it could be seen as a pavement plan or a zoning plan, which would not have been the best representation of a characteristic which is more of perception and sensation in the place rather than a building plan. Therefore, since the aim of this master's final work is to represent the urban permeability in the space, as the public space expands through the city and buildings; the intention then is to show through the maps the experience that the users live in the place in terms of permeability. A form of representation is developed in a very personal manner which includes the most important aspects of permeability: porosity, viscosity and pressure interpreted in a singular and graphical perspective (figure 20) which when combined the three layers equals the permeability of the place. It is thus possible to identify the relationship that creates the permeability between the environment and the human being. The base data is obtained from the architectural project and the urban fabric as a base, but interpreting the concepts mentioned in such a way as to obtain graphs of the situation of permeability in the place through. This is interpreted as urban permeability, an experience and perception to which users are exposed in their public life.

The porosity is represented by purple dots in different scales which mean the existing possibility to use the space by the pedestrian, through which they can move in different levels and the dots grow as the possibilities of encounter grow resulting in clusters of pedestrian relations.



The viscosity is represented in two manners, the zigzag which means the topography change through ramps or slopes in the area and the lines drawn in the setbacks of the architectural configuration which lead to a turn or forced movement of the people through the space.



The pressure is represented through small squares with different colors with the intention to show the variety of activities with different colors, also how the experience is enhanced when they overlap creating new sensations - colors in the space.

Figure 20. Mapping permeability.

3.4 CASE STUDY: L'ILLA DIAGONAL SHOPPING CENTER

The case study of the project L'illa Diagona Shopping Center (figure 21-22) by Rafael Moneo and Manuel de Solá-Morales is developed in this section; this project has been chosen because it is a space that is integrated in the city, no matter what day or time it is, pedestrian access is an option despite the fact that the commercial activity is not open which means that it is not an isolated private facility in respect to the environment but a collective space that maintains the activity in the city. As Kris Scheeerlinck mentions Rafael Moneo and Manuel de Solá-Morales "decided to show it was possible to make a building that would embody bigness -they laid out a plan to make a building as if it were one giant building block, part of the Cerdà-grid and absorb collective life at the smallest scale simultaneously"[34], which is easy to see when one walk through the space, a continuity of ramps, openings in the facades and wall leading routes which make the pedestrian the most important part of the project. The L'illa Diagonal Shopping Center is part of the L'illa Diagonal Block[35], a project which consists on the urbanization of a block located in the northwest of the city between the streets Déu i Mata, Numància, Entença and Av. Diagonal (figure 23), through five volumes located in the perimeter and around a central free space. The land was located in a peripheral area of the city between two models of planning so the team of architects seeks to integrate these differences using a compact block with various activities in front of the Av. Diagonal and relating through the existing topographic slope towards the south with the continuous blocks of the neighborhood of Les Corts. The proposal which includes a complex of mixed uses that integrates offices, hotel, commercial, dwellings and leisure zone achieves a set of volumes that integrates with the important Av Diagonal and the district of Les Corts (figure 24).

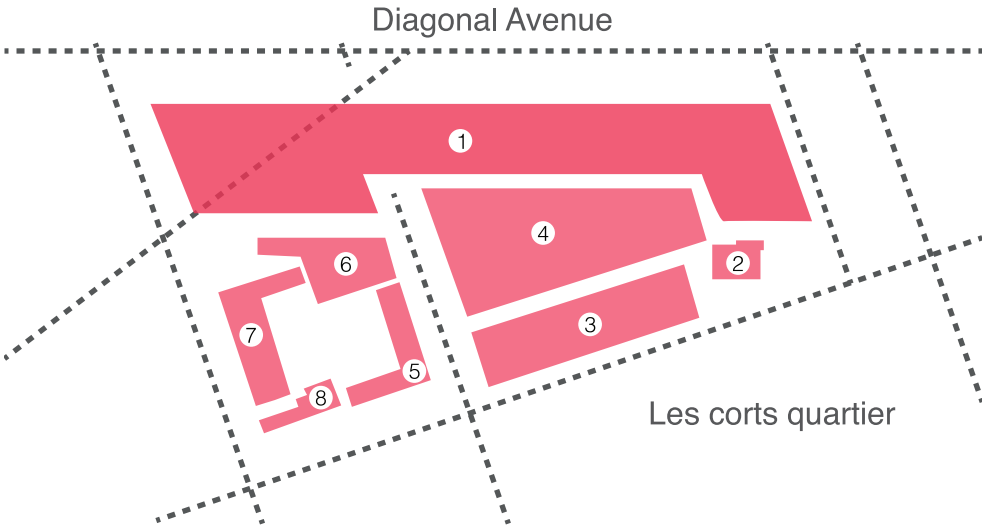
34 Scheerlinck, K., 2013. *Collective Spaces Streetscape Territories.* Ghent, Brussels: Dag Boutsen, p. 43

35 GRC Studio, 2014. *GRC studio.* [Online] Available at: http://www.grcstudio.es/portfolio/p-l-o-t-_-03-illa-diagonal/ [Accessed 2 February 2017].

Figure 21. L'illa Diagonal. Source: Centro Vasco de Arquitectura.


Figure 22. L'illa Diagonal. Source: Javier Ortega.

Figure 23. L'illa Diagonal and the roads around the project. Source: Google maps.



1 Main building
2 Conventions center
3 Hotel
4 Jardins de Sant Joan de Deu
5 School Santa Teresa de Lisieux
6 Sports facility
7 Public school Itaca
8 Can Roses Library

Figure 24. Functional layout.

Figure 25. View from Diagonal Avenue sidewalk.

The commercial block to the north of the project is directly related to the Diagonal through a facade of 350 meters long which the architects projected in such a way that links with the continuity of the avenue and relates with the wide sidewalk, but in the other side (Carrer de Deu i Mata) is a more fragmented project in order to achieve a better integration at neighborhood. It is important to mention that the project was influenced by both vehicular traffic and then pedestrian design. Thus, the street parallel to Numancia crosses the project at level -1 where some commercial areas are located. It is of great value the way in which the architects designed the collective space of the project, L'illa Diagonal is a continuous space, that despite being located in a place with unevenness of the topography, the ramps seek and achieve continuity and the public space integrates the functions. The commercial block is enclosing a longitudinal pedestrian street that connects all the uses and is the organizer of the project; also there are other pedestrian streets which intersect and boost the circulations throughout the space. The plaza located in the central part of the block is developed on two levels and is a space of great diversity and very used today. The commercial building is proposed in different layers, in which Moneo and Solá-Morales make use of architectural re-sources as repetition of forms, colors, materials and perspectives to achieve order with unpredictability; for example the levels that are destined to public uses are mostly of dark color with big stained glass that contribute transparency against the solid one of the higher levels (figure 25).

As far as the most relevant materials of the project are granite, travertine, glass and steel and as mentioned, they are what differentiate and characterize the activities that are developed in the different spaces of the project.

L'illa Diagonal Block is a parallelogram shaped block located in the Les Corts quartier; the way the architects chose the emplacement is cruitial for the achievement of the integration of the project with the context. In this way they adopt

two main decisions, the shopping building which faces the Diagonal Avenue and the fragmented buildings in the south part in order to face the smaller scale of the Les Corts blocks. L'illa Diagonal block is well connected through main vehicular and pedestrian roads, one of the vehicular roads goes through the project integrating the block with the road network; the public transport including buses and tram supplies the necessity of the inhabitants and visitors of the zone. The variety of uses imposed by the architects is a quality that maintains the project active in different hours of the day which leads to a well integrated project, these includes, commercial activities, education, dwellings, among others.

The connection with the surroundings are present in the project in many ways, Rafael Moneo and Manuel de Solá-Morales took important actions in this context; the pedestrian flow moves with a continuity all along L'illa Block and linked with the surrounding blocks. They decided to continue the alignment of the Carrer d'Anglesola and cross the project creating a sort of shortcut in the limit of the project, this slowly promotes the people to enter the shopping area instead of going around it, all these actions are created through links as open spaces, ramps or stairs of public use.

Analysis

The collective space in L'illa Diagonal is in my opinion the most important resource employed by the architects to achieve the success of the project; the variety of spaces used along the project add the complexity and make the space interesting and enjoyable. It is important to mention that is not only the connection as ramps or stairs which keep the project as a whole instead of isolated spaces but also the environment of each zone which leads or bonds to the next one; for example the double height, the irregularity in the plans and the retracted spaces and the enter of natural light which create more interesting atmospheres and attracting the people to pass through the space or stay in it (figure 26).

There are also key spaces which are crui-

Figure 26. Interior view. Source: main.net.

tial in L'illa Diagonal. Even though there are many access to the project each one leads to a interesting space, for example the extension of the Carrer d'Anglesola as mentioned above crosses the project promoting the people to walk through it and use the shortcut instead of bordering the project, leads to a symbolic space, a open and high mode of interior plaza where many activities happen, beside the commercial also pedestrian attractive activities, this access is one of the most active spaces (figure 27), the strategically position of emplacement is not the only key point of its performance, but also the uses located in both ends which magnetize the people to step on. Other important access is the lobby located in the Diagonal Avenue (figure 28), a wide and high space which shows monumentality and characterizes the access without leaving any chance to misunderstand the project even if it's the first time anyone visits it. Even though the project has evidently a mixed use program, it is essential to talk about the way the uses are loca-

Figure 27. Extension of Carrer d'Anglesola

Figure 28. Main access trhough Diagonal Avenue. Source: bcncoolhunter.

Figure 29. Underground level.

ted, for example the food court and supermarket (figure 29) located in the first underground level is a zone that is integrated through the collective space and works as a unit itself with a variety of restaurants and cafes but it is linked with the rest of the project, this kind of space is a requirement in a project to maintain it alive and energize the project.

After analyzing some of the collective spaces located in L'illa Diagonal, it is necessary to continue to develop the main interest of this TFM; the project includes a variety of spaces which are permeable in the right level either visually or physically. These spaces and their links, work as a complete and undivided unit and conform a collective space structure; the complexity of the spaces and the vertical/horizontal connections introduce an intriguing and interesting atmosphere to the users and pedestrian.

The pedestrian flows have been drawn at ground level (figure 30) in which it has been identified that the central passage that although it is inside the project has almost the same level of activity as the sidewalk of Diagonal Avenue, people make use of the collective space not only for shopping but also as part of their daily routine. As part of an investigation carried out for the Contemporary Architectural Issues class of this master[36], counts were made in five points of L'illa Diagonal Shopping center to identify the variety of activities that are developed in the ramps and stairs. As a result of this research project it was also identified the pedestrian flow in the mapping points; and in the same way that is observed in the flow map, the access through the extension of the Carrer d'Anglesola is one of the most used. In the same analysis it was determined that people use L'illa to cross the block instead of going around the perimeter of the project, which indicates that it is a permeable space and also offers useful connections in the city for pedestrians, which means is linked to the city through the collective space.

In this context the next step has been to map the permeability looking for an easy way to understand the concepts develo-

36 The name of the project is Stairs, Ramps & Slopes. The interaction between people and urban elements in EU Mies Awards projects in Barcelona and it was done along two other students, Mario Galvis and Elsa Gheyamiazad

ped in the first chapter and with the key findings of this chapter.

Porosity

In terms of porosity, the resources used by the architects generate porous spaces visually and physically through bridges, variable height spaces, stairs, slopes, passages and urban furniture. As we can see in the porosity map (figure 31), the 'empty' space is all along the project, in some areas the pores accumulate and collide generating bigger pores which are also where the pedestrian flows intersect the most, this leads to think that in these areas are where the most encounters could happen since there is the chance to go through them.

Viscosity

When looking at the project architectural plans, the viscosity is easy to see, it can be identified a sequence of irregular spaces which create voids and surprise situations[37], also the angles of the building are located with a determinate intention as inducing the pedestrian flow towards a way or another. The level difference among the spaces, linked through ramps and stairs, and the irregularity of the walls arrangement in the building brings in to the project complexity and also the so important collision of the people with the project making them to move along it at different speed, sometimes only passing, going at a slower pace or even stopping and experience the space. In L'illa Diagonal Shopping Center the viscosity is very important, walking through the space and having to go up and down, turn or being directed without even realizing makes the place an interesting atmosphere to be in. As it can be seen in the viscosity map (figure 32), there are many level changes and the wall viscosity is present in most of the ground floor area.

Pressure

Finally, since it is a commercial project, the pressure is a constant all along the space, the variety of activities and the dynamism of the design are a force which attracts the people to use the space (figure 33). Even though when walking through the Diagonal Avenue, the access is not right at the beginning, the visual permeability of the stores in the ground floor[38] make the walk interesting and attracts the people as a magnet to the project keeping them alert of what is going to happen.

Permeability

By superimposing the three layers of viscosity, porosity and pressure maps, one can observe in an abstract and personal way the permeability (figure 34) that has been identified in L'illa, a space open to the city in which the circulation as shown by the map is easy to identify, in addition offers a variety of activities that are attractive forces for the people contributing with activity to the city at different times of the day; moreover, it is important to note that the viscosity of the project makes the experience of the project an interesting place for pedestrians with turns, ups and downs which keep them alert and wondering what will happen next.

This analysis has been developed also in the first underground level (figure 35-36-37-38-39). Since the interest is to understand how L'illa Diagonal Shopping Center is connected to the urban tissue which happens primarly in the ground floor it also happens in the underground which is accesible for pedestrians directly from the city therefore the maps are neccesary as well. And finally since the first floor level is also accesible as a shopping area the maps show how connected are the spaces between levels through permeable areas. (figure 40-41-42-43-44).

37 When facing an element and having to make a turn it is a doubt of what we are going to face, when this is repeated in a space sometimes it can create a feeling of a labyrinth which makes the space more stimulating.

38 See section 1.2: The importance of the ground floor activity

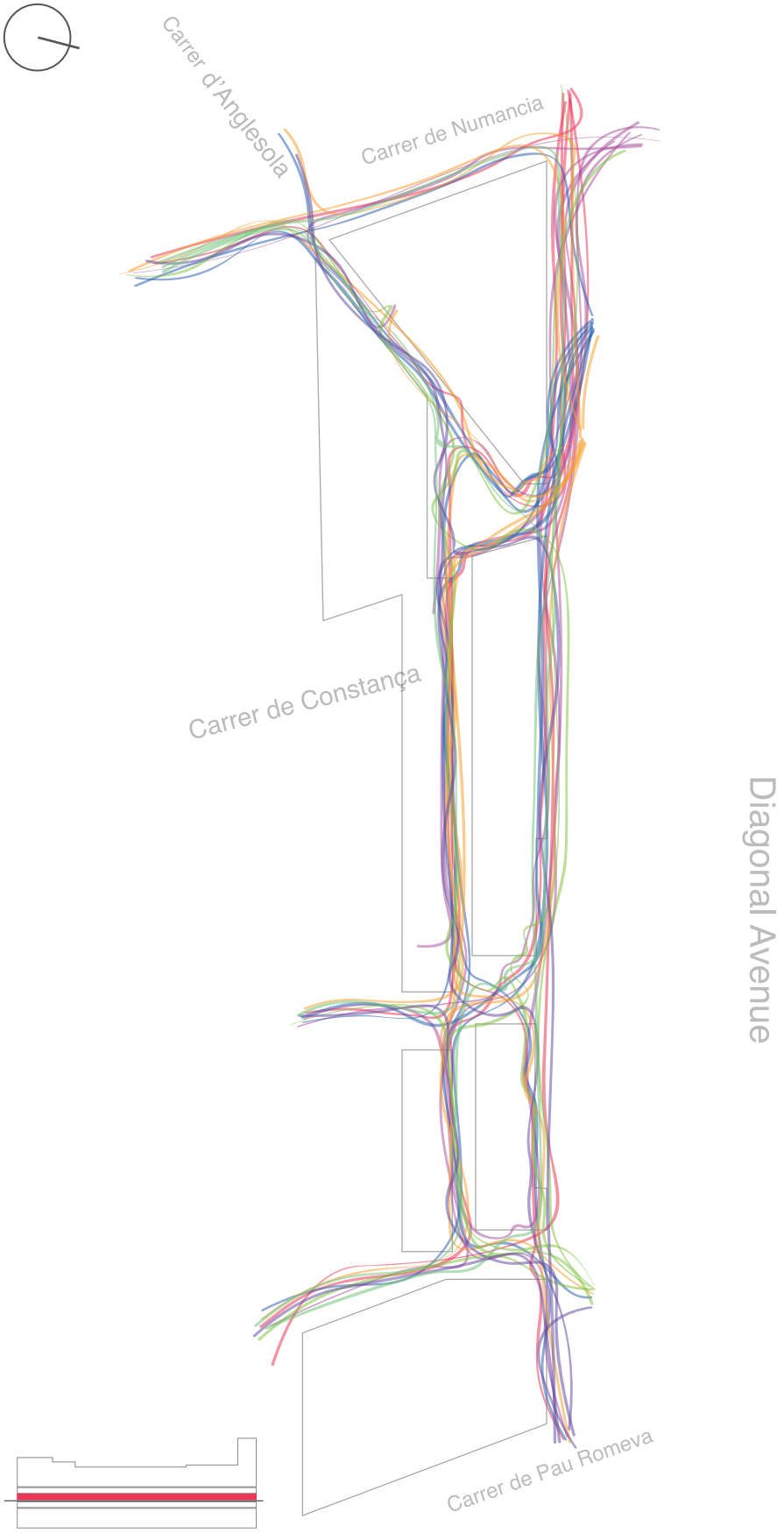


Figure 30. Pedestrian flow.

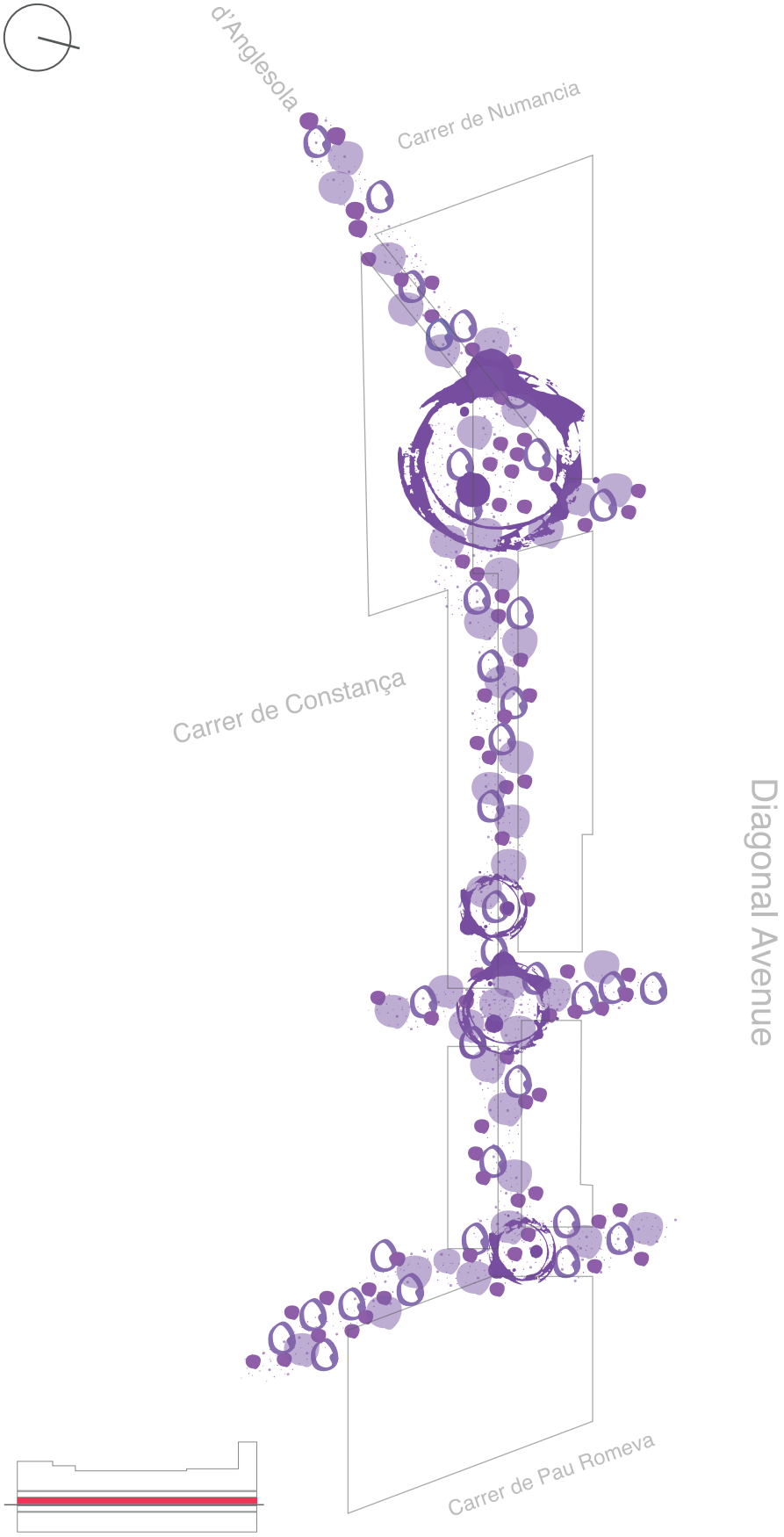


Figure 31. Porosity map in the ground floor

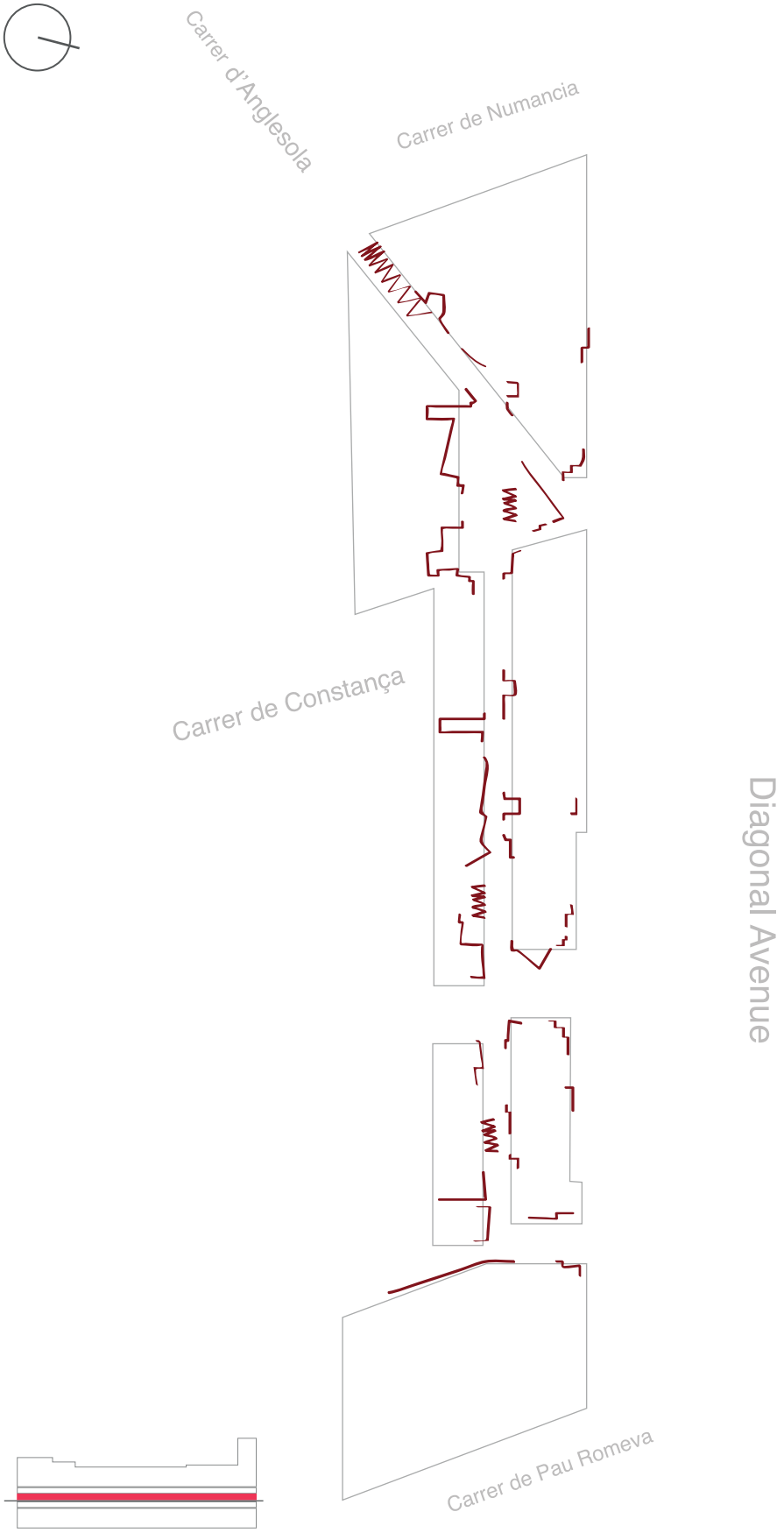


Figure 32. Viscosity map in the ground floor

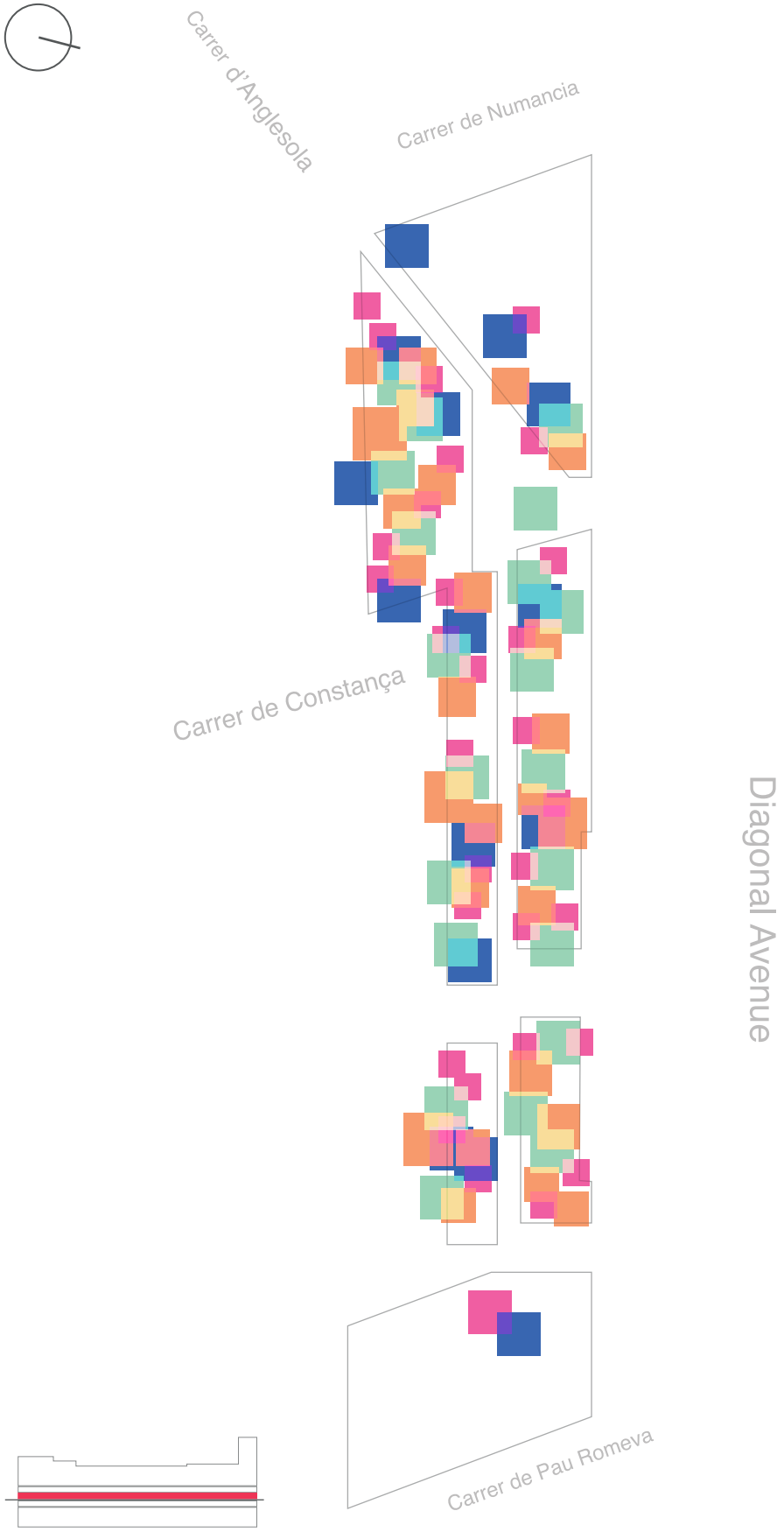


Figure 33. Pressure map in the ground floor

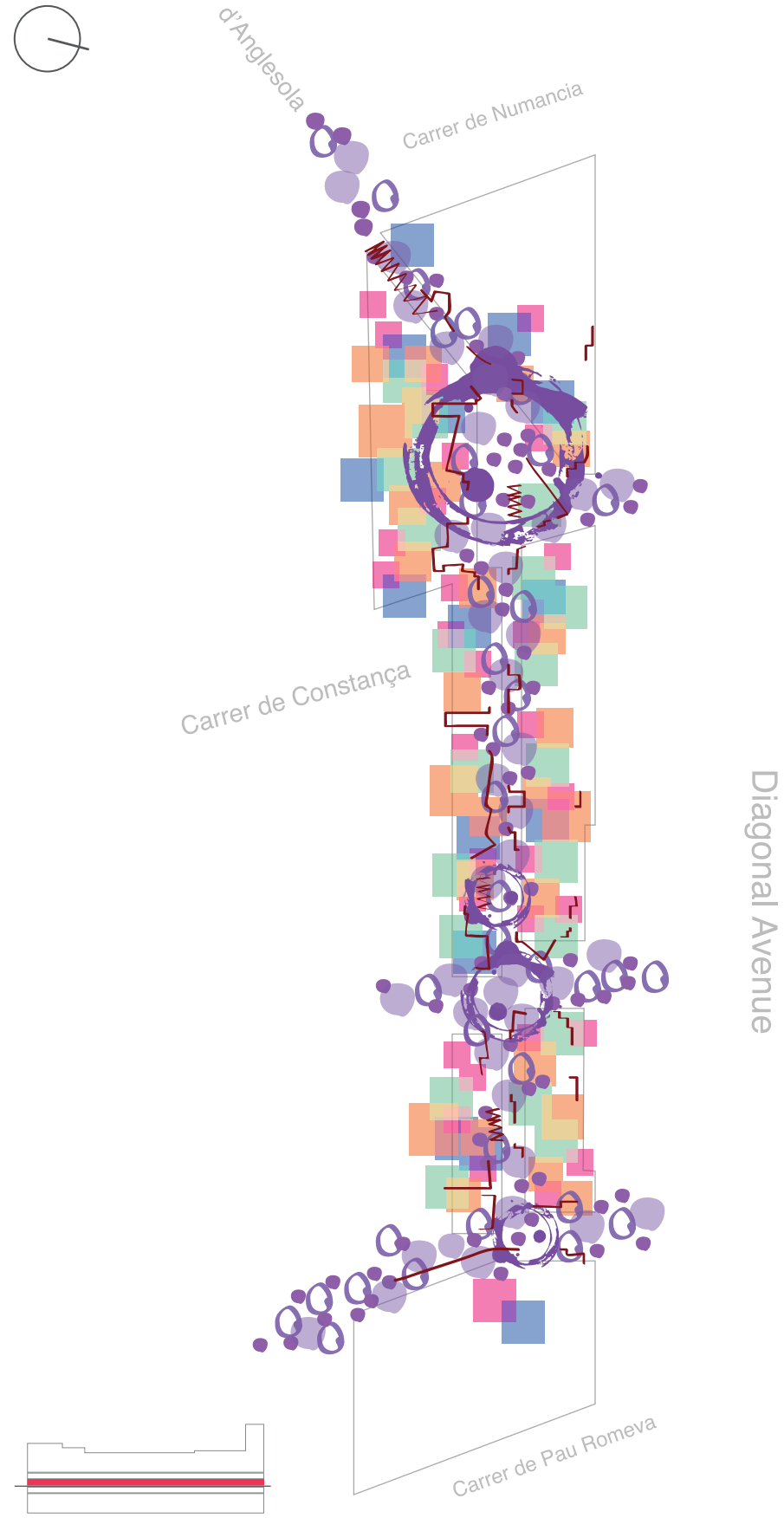


Figure 34. Permeability map in the ground floor

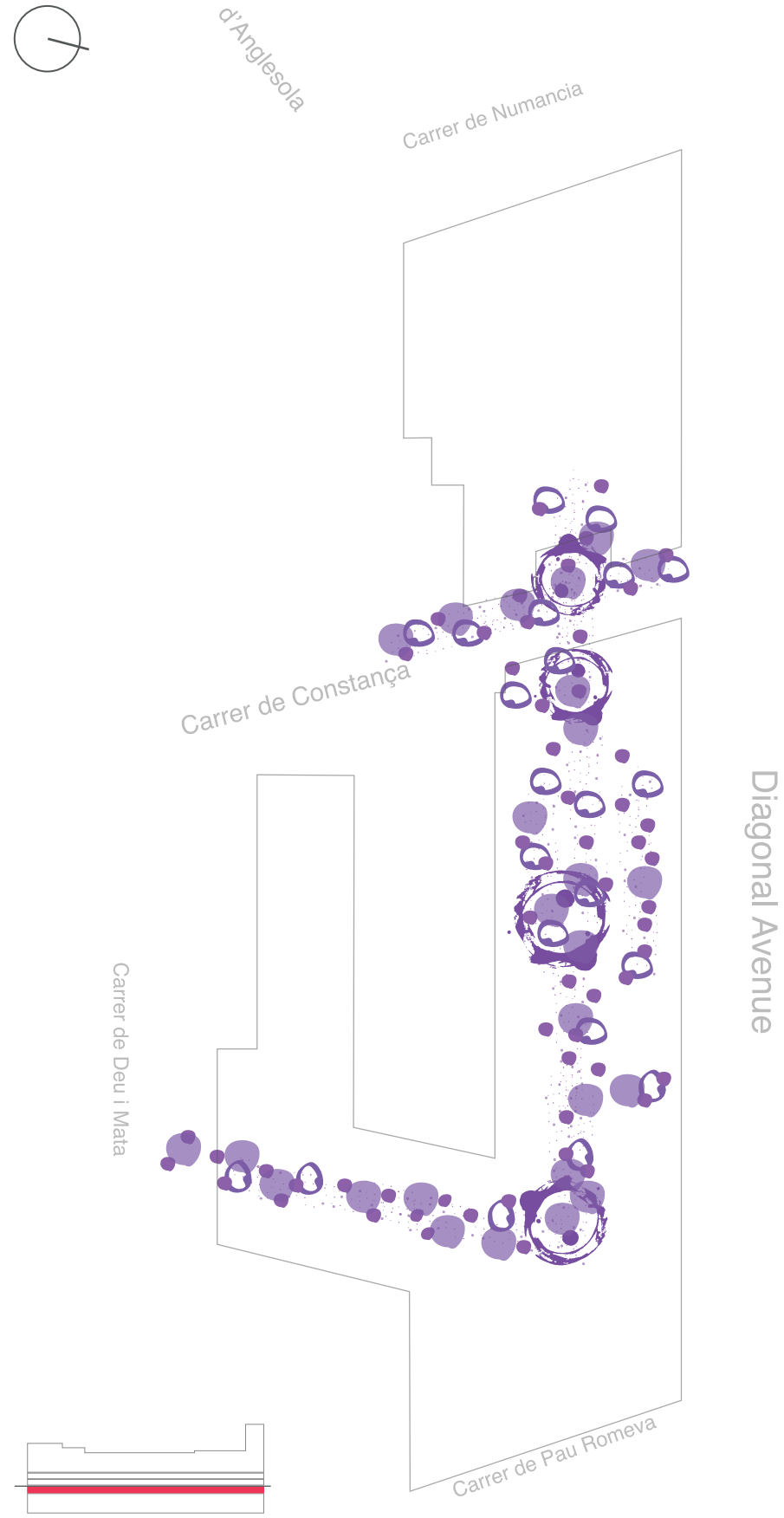


Figure 35. Porosity map in the first underground level

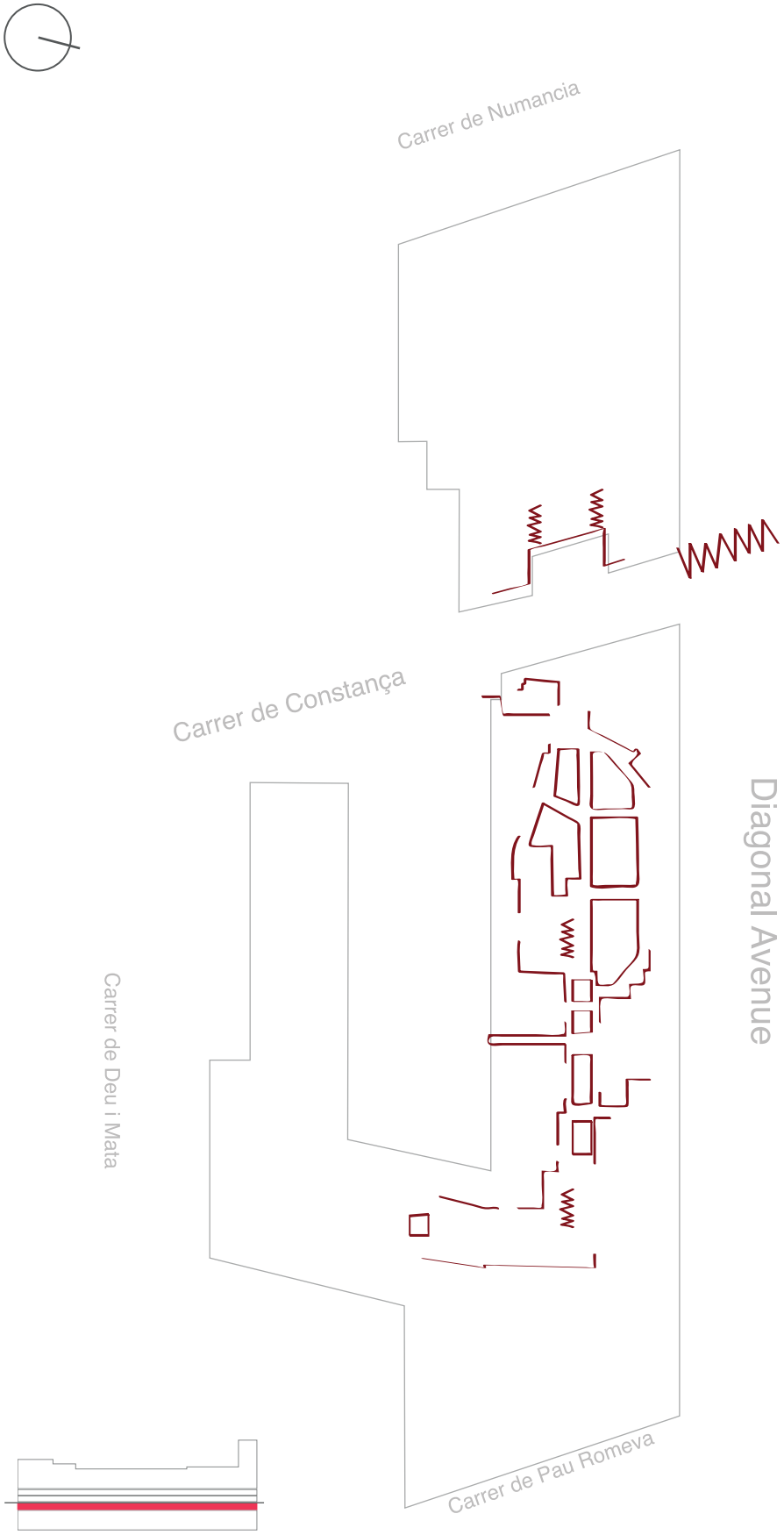


Figure 36. Viscosity map in the first underground level

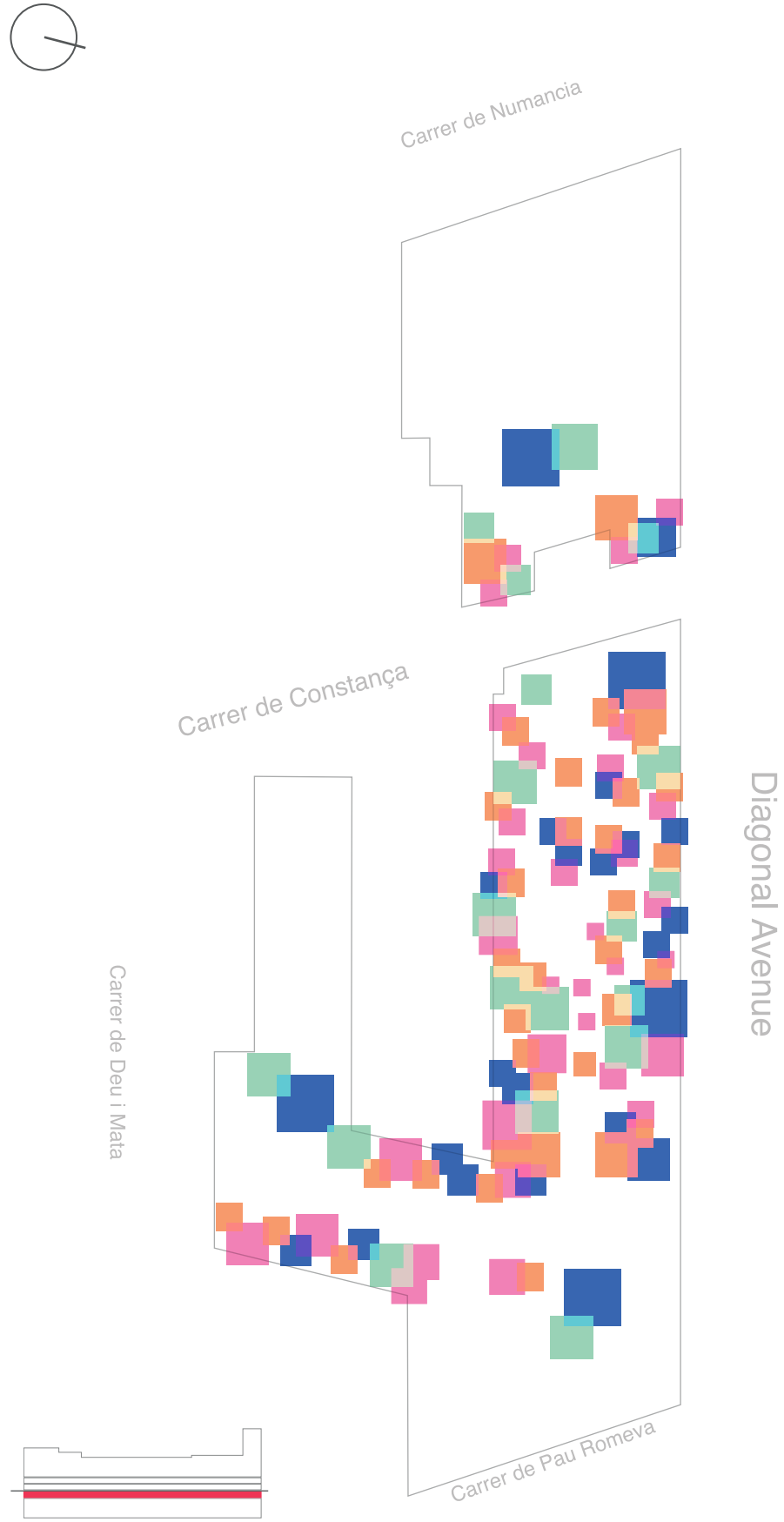


Figure 37. Pressure map in the first underground level

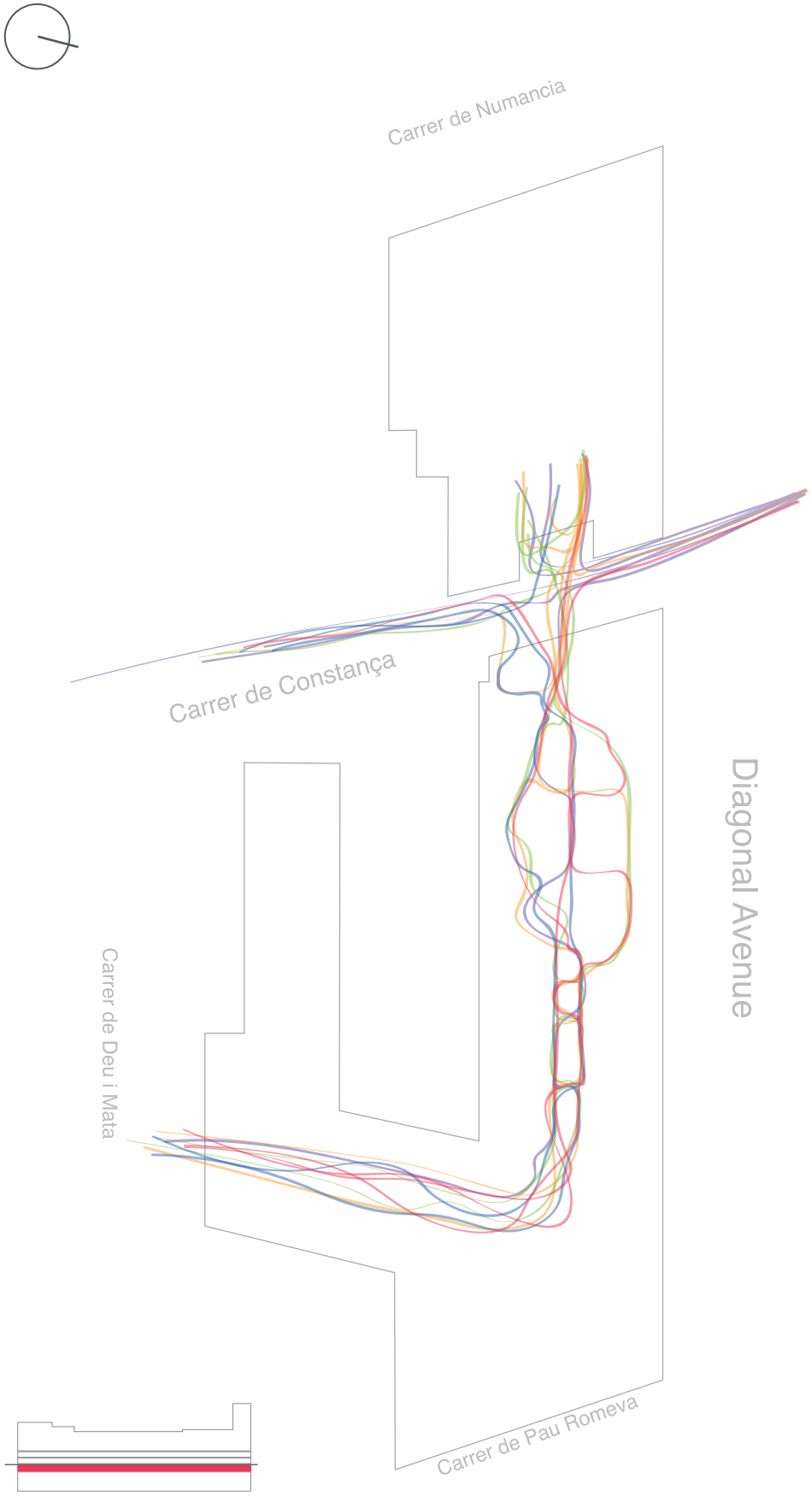


Figure 38. Pedestrian flow map in the first underground level

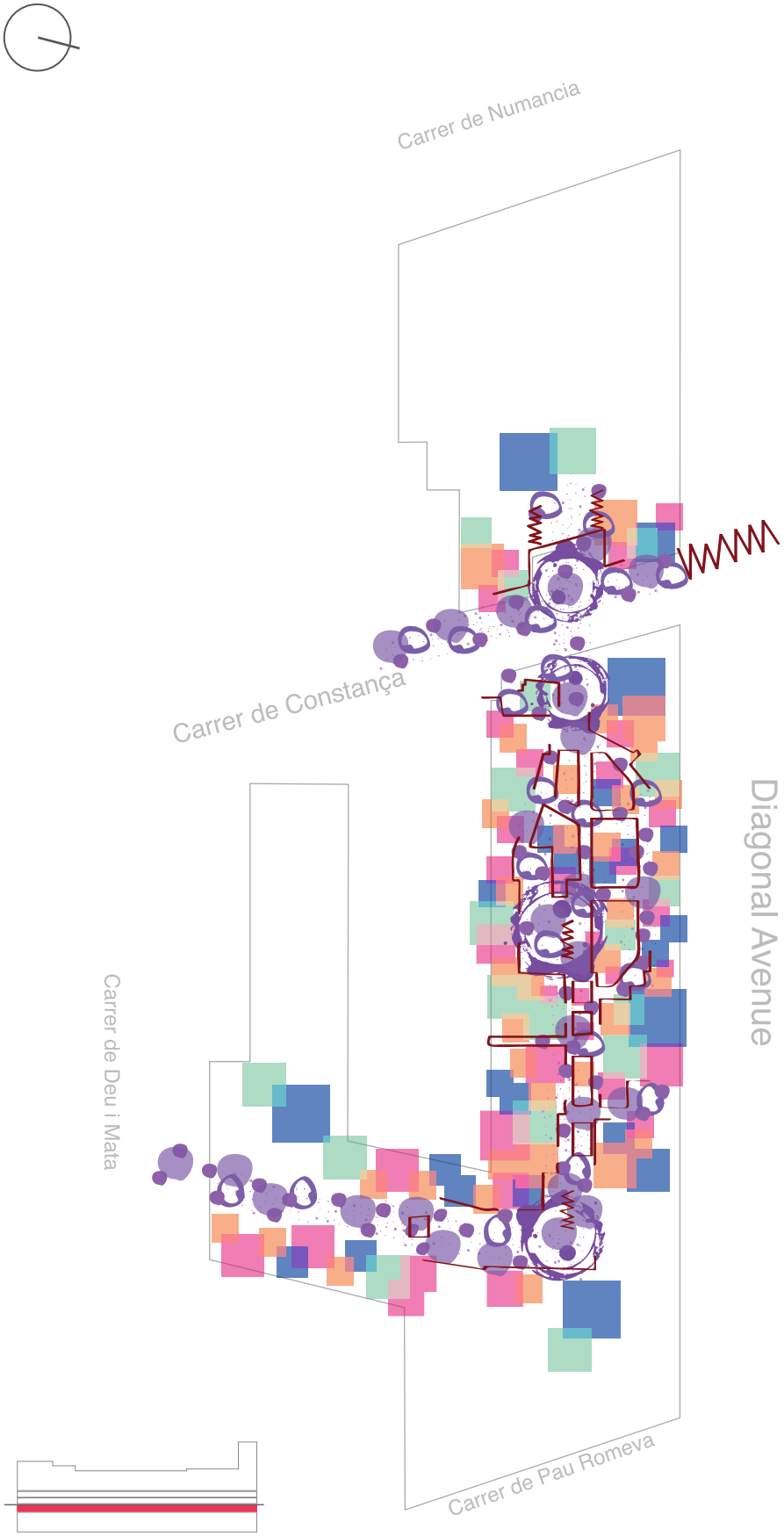


Figure 39. Permeability map in the first underground level

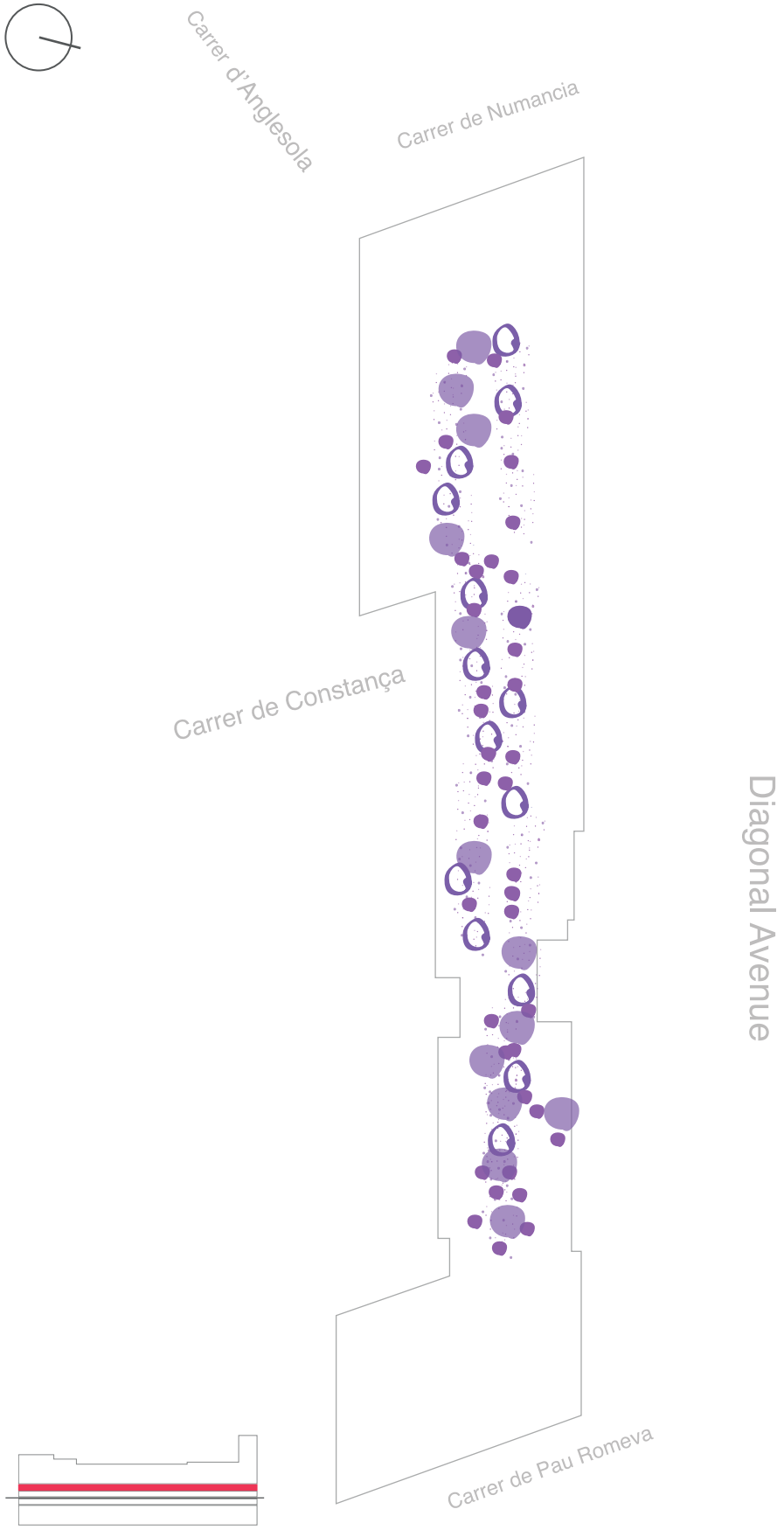


Figure 40. Porosity map in the first level

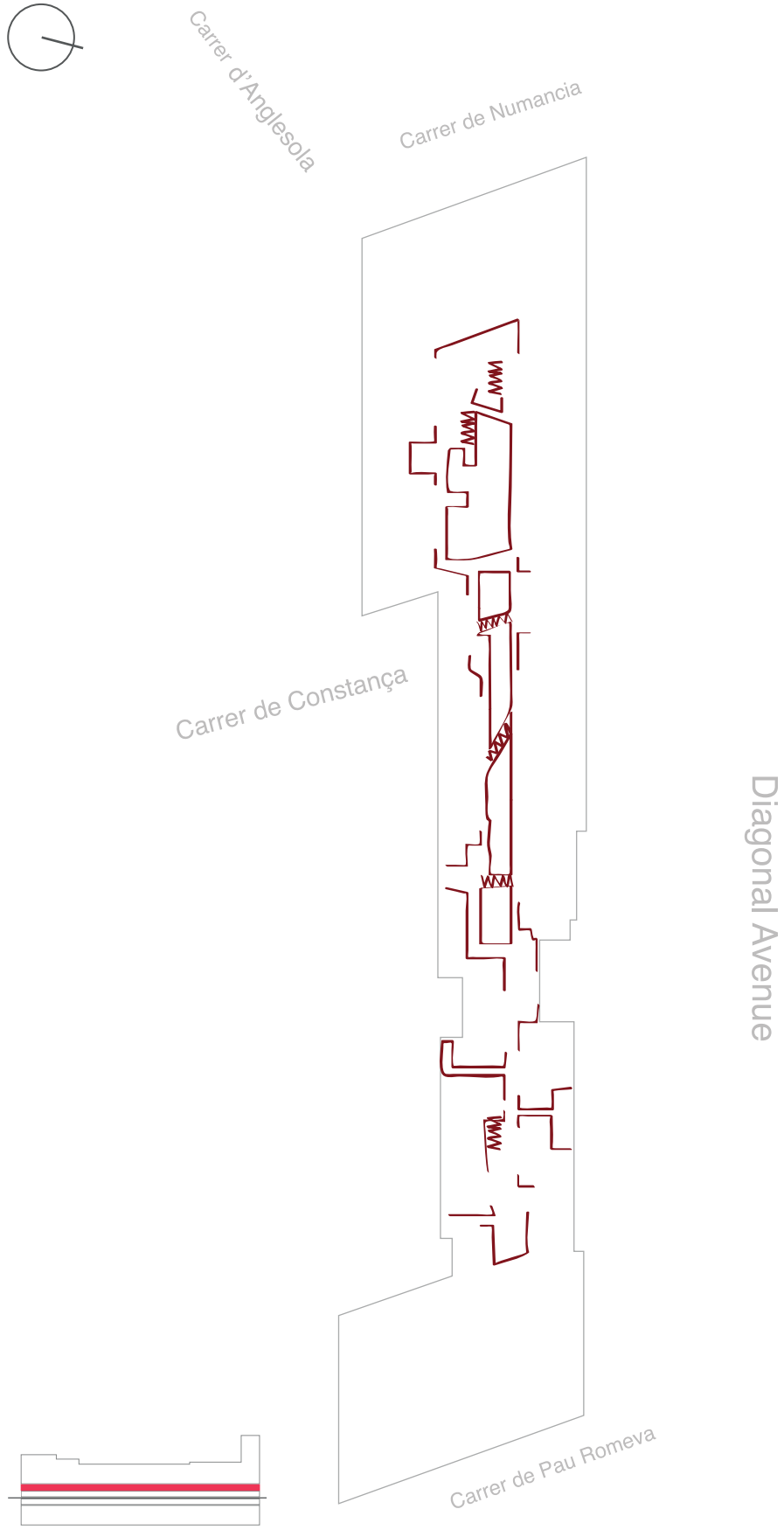


Figure 41. Viscosity map in the first level

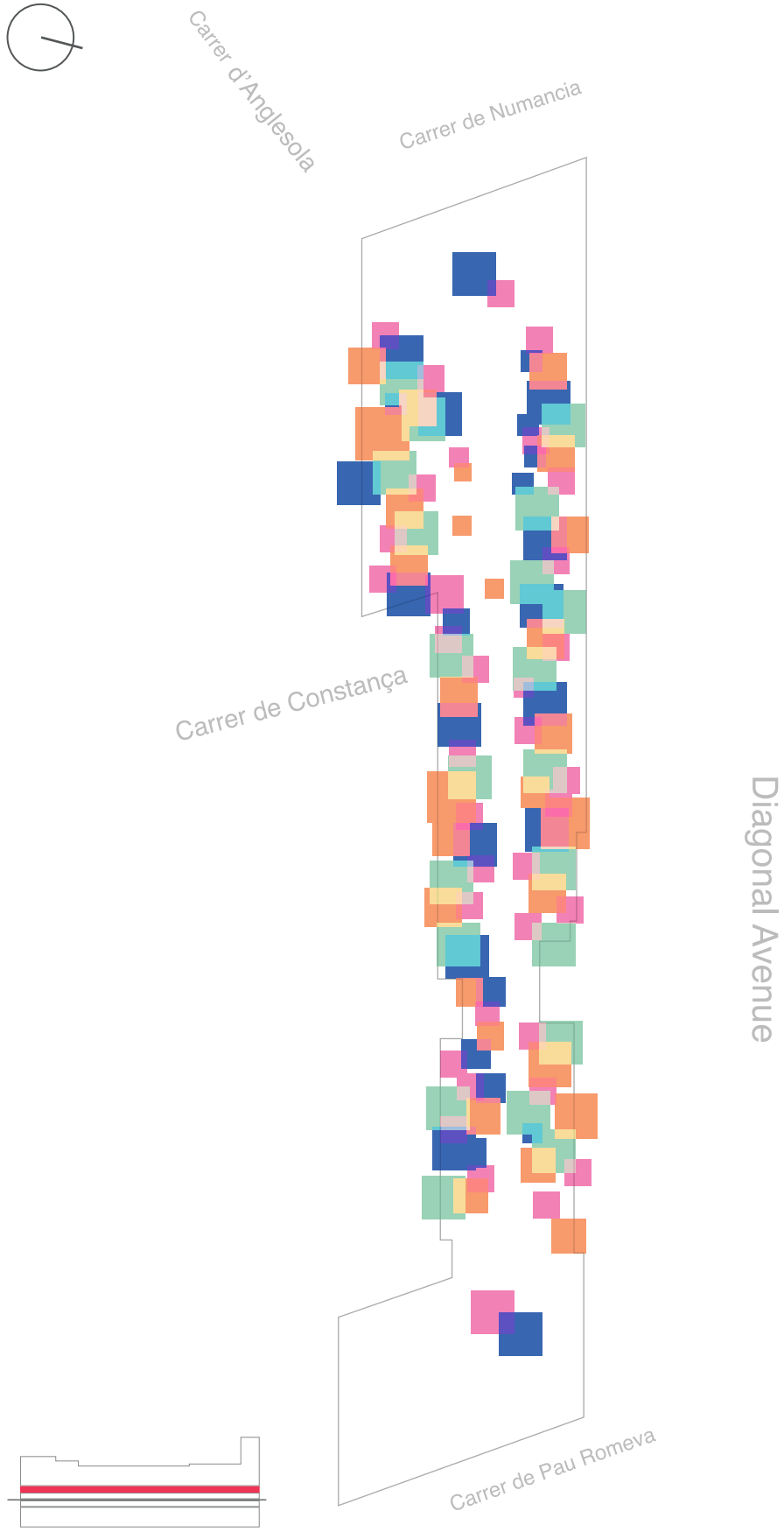


Figure 42. Pressure map in the first level

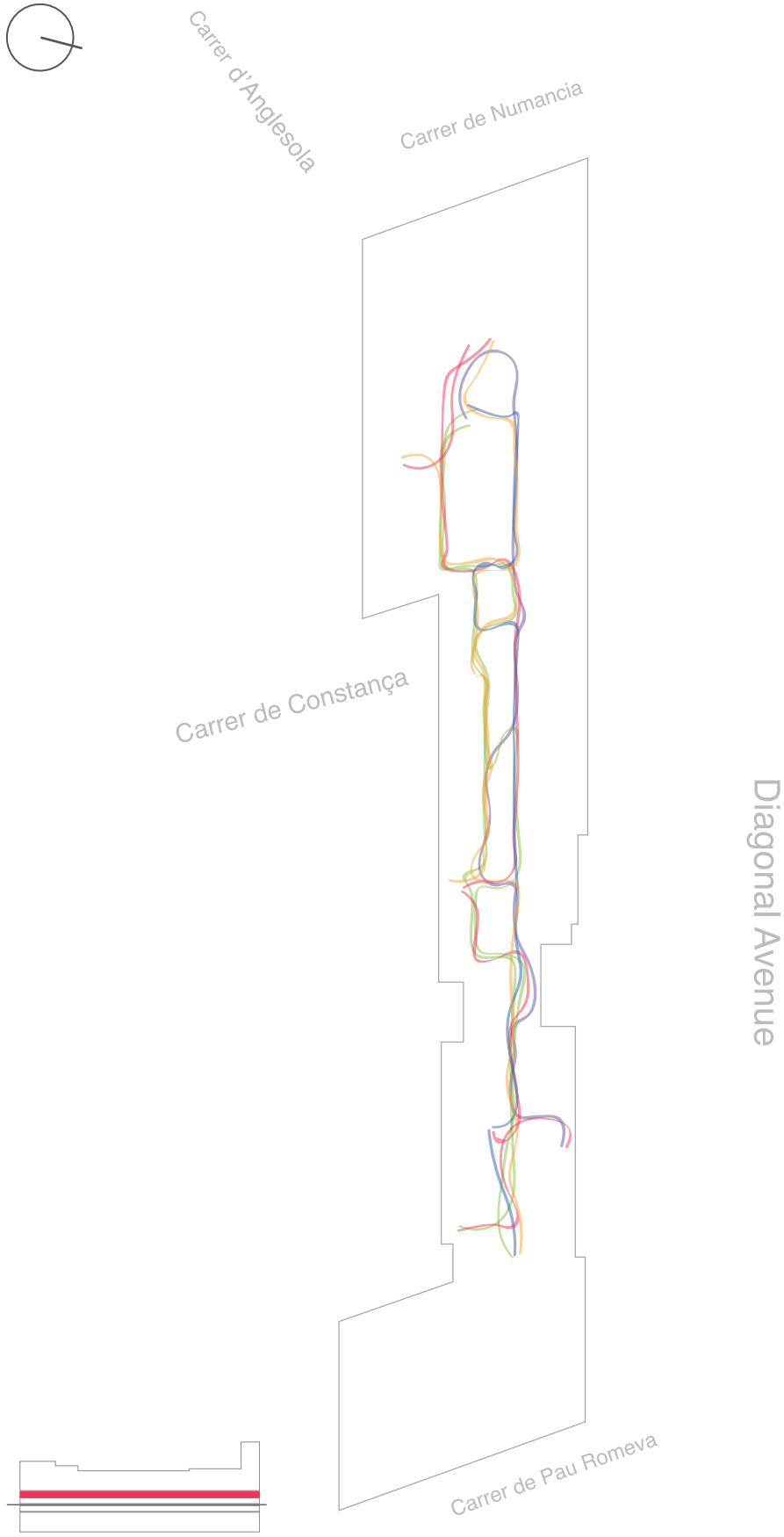


Figure 43. Pedestrian flow map in the first level

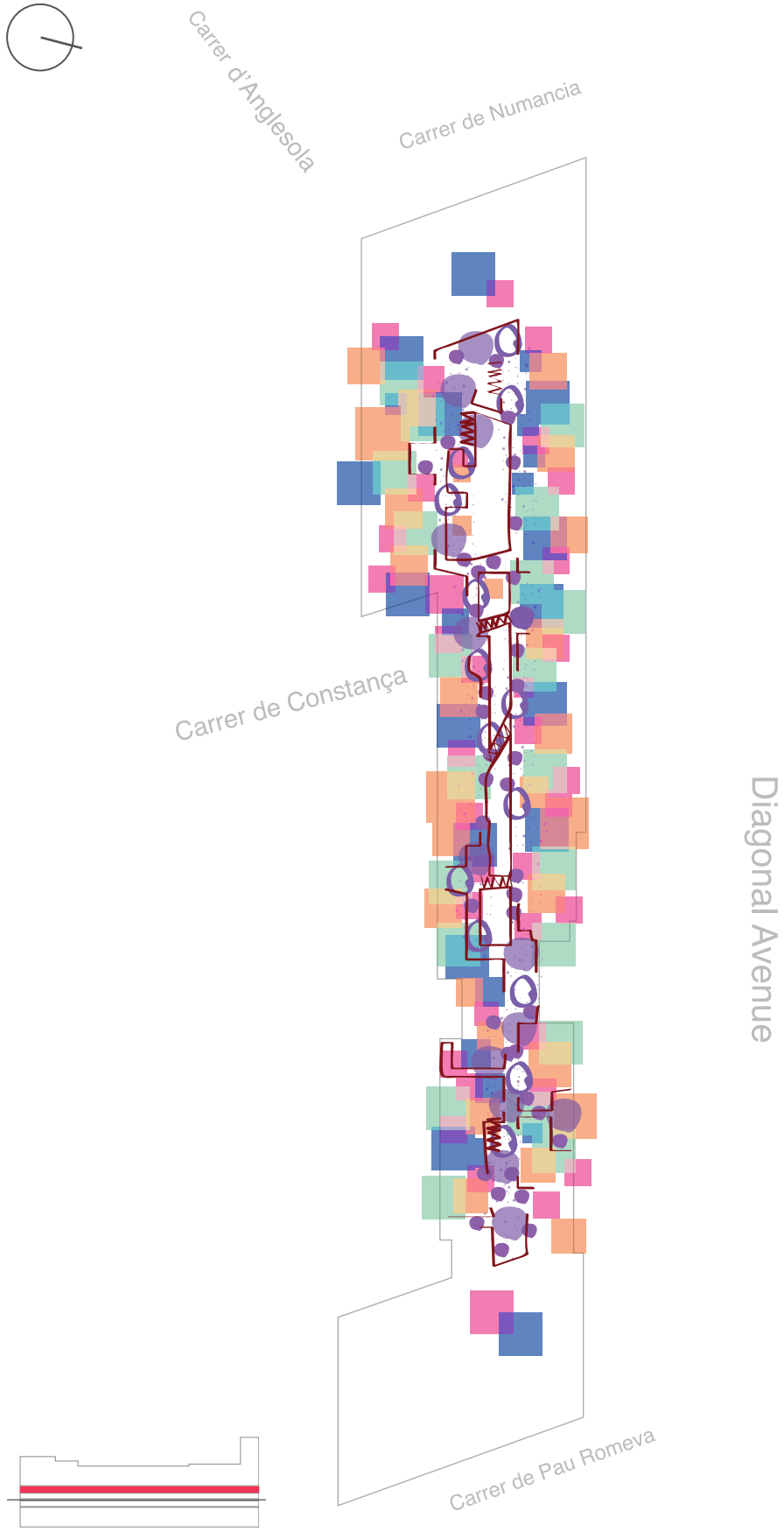


Figure 44. Permeability flow map in the first level

In L'illa Diagonal Shopping Center the connection between the city and the project is evident; the pedestrian routes are part of the urban fabric so the people move continuously through the space. The integration of the project with the city has been thanks to the decisions taken by the architects at the moment of designing which have shaped spaces on a human scale despite being a large scale building. In the maps shown above it has been possible to observe that the porosity, viscosity and pressure are practically present throughout the project, making this a permeable space; in the same way is evident in the pedestrian flows with the variety of options available and the large number of connections existing with the neighborhood. The selection of this project as a case study has been very beneficial for this master's final project because it has not only allowed to comprehend through the application, the concepts of permeability described in the previous chapter but additionally has been a reference in terms of collective space, connections between spaces and multiplicity of uses; features that are considered necessary for the application of permeability in other scenarios.

LINKING THE MARKET WITH THE CITY

Finally, with the previous chapters as background, this chapter continues with the application of the concepts assembled in the beginning of the research; which includes a design exercise as tool for the research. This exercise seeks to illustrate and use the urban permeability as a part of the designing process. Since markets have been one of the main interests of this master, it has been sought that the exercise of this work is linked to these facilities as well. This chapter presents a study of markets as public spaces with a highlighting on the markets in Barcelona as scenarios of other activities; a brief analysis is then presented on the neighborhood where the project is carried out (Sant Gervasi - Galvany) and on the market to which it is linked (Galvany Market). This chapter concludes with the maps of permeability as design tools and the architectural plans of the public space that links the Galvany Market with the neighborhood.

Cover image of the chapter: Sant Gervasi - Galvany
Source: maps.stamen

Back cover image of the chapter: Galvany Market and its surroundings.
Source: maps.stamen

4.1 THE MARKET AS A PUBLIC SPACE

The markets are facilities of public access that have fulfilled a very important function throughout the history in the cities. As we know, they are the space where the trade of all types of products is done, depending on the type of market[39] that it is, but they do not only cover the function of being the stage for trade, they are also scenario of the social activity in the city (figure 45). "The market has been the heart of the city, the foundation of urban life"[40], they can be one of the tools that transform the neighborhoods and the city because they change the flows of people; that is to say that the markets, besides having an economic function in the city, have a social function where it can happen a variety of activities like the encounter, conversation, festivals, workshops, etc. By the role that the markets play for the inhabitants they mean a bond to the city and they can generate a sense of belonging with the neighborhood since it is the place where they are related through social, cultural, solidarity activities, etc., promoting the civic values in the citizens [41].

But for markets to fulfill their full function in the city, it is considered they should be integrated spaces, with areas that invite people and opportunities to use them in addition to commercial activities (figure 46). As mentioned in Urban markets: heart, soul and motor of cities, markets must fulfill a variety of aspects in order to achieve their purpose in the city, not only of commerce but also as social and economic cohesion; among these aspects is that markets should be "where people see friends and meet and greet their neighbors, stimulating the dynamism of the neighborhood - even beyond market opening hours" [42], which leads to reflect that markets are a common ground that play an important role in stimulating the vitality of neighborhoods, which are a highly sociable place and should promote social cohesion (figure 47).

In the recommendations for the markets improvement they remark the creation of attractive markets with amenity values and inviting spaces to stay, in order to convert the market in a place for residents to meet and socialize not only

39 There are different types of markets depending on what they sell as fresh markets, flower markets, flea markets or second hand markets, etc.

40 Arnas, G. et al., 2012. *The markets of the Mediterranean. Management Models and Good Practices.* Barcelona: Institut Municipal de Mercats de Barcelona, p.12.

41 Ajuntament de Barcelona, 2015. *Mercats. L'experiència de Barcelona.* Barcelona: Institut de Mercats de Barcelona.

42 URBACT, 2015. *Urban marjets: heart, soul and motor of cities.* Barcelona: IMMB European Union, p.18.

Figure 45. The importance of the market. Source: URBACT

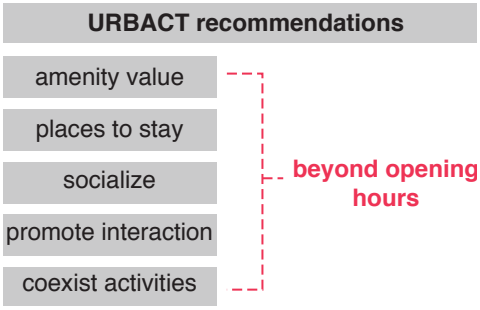


Figure 46. Recommendations for market success. Source: URBACT

Figure 47. Markets offer opportunities for economic development. Source: URBACT

on market working hours but after the market is closed as well, contributing the social interaction and the security in the neighborhood; also, the surrounding space of the market should be accesible where cultural events or other neighborhoud related activities could happen. (figure 48). Therefore, it is considered that the area surrounding the market should be attractive for residents to arrive, stay, spend time, buy and socialize, even after they close the market where spaces are provided to hang out and observe the interaction between Market and the city[43].

43 Ibid.

Figure 48. Party at the Ninot Market. Source: Pau Fabregas.

4.1.1 MARKETS IN BARCELONA

Figure 49. Castelliers in Sants Market. Source: Jordi Casañas.

"Markets are one of the sectors that make Barcelona a more human city"[44], they are reference elements of the city's neighborhood and have been of significant importance along the history. In Barcelona, markets have been scenario of various activities other than the trade itself such as town festivities where citizens and tourists enjoy the events within these public spaces like the 'castells'[45] at the Sants market (figure 49). The remodeling of the Barcelona markets has contributed to the improvement of the urban life of both residents and visitors, as well as boosting the commerce of the markets and the shops in the surrounding area. It is in this way that the markets generate social cohesion in the neighborhoods of the city, the public space is strengthened and increases the interrelations of the inhabitants (figure 50). The importance of pedestrian in the remodeling process of the markets has led to the pedestrianization of some streets in the surrounding of the market which benefits and increases the activity in restaurants and shops in the area such as in Mercado de la Libertad in the Gracia neighborhood (figure 51).

44 Raimond Blasi, President of the Institut Municipal de Mercats de Barcelona in Arnas, G. et al., 2012. *The markets of the Mediterranean. Management Models and Good Practices*. Barcelona: Institut Municipal de Mercats de Barcelona.

45 "Castells –a Catalonian word that means castles– are a cultural phenomenon particular to Catalonia and consist of erecting human towers." Colla Castellers de Barcelona, 2014. *What exactly are castells or human tower?* [Online] Available at: http://www.castellersdebarcelona.cat/international/what-exactly-are-castells-or-human-towers/ [Accessed 02 June 2017].

Figure 50. Social event organized in St John Market in the Old Town, City of Wroclaw. Source: PIANOFORTE

Figure 51. Mercat de la Libertat. Source: barcelonacheckin.com

4.2 LINKING THE GALVANY MARKET WITH SANT GERVASI - GALVANY

Figure 52. Mercat Galvany. Source: Reproducao

In this context and in order to carry out a design exercise for this master's degree project, it has been pertinent to look for a market in Barcelona that, according to the concepts presented in this work, is not connected to the urban fabric of the city. The case selected to work is the Galvany Market (figure 52), which currently has a perimeter wall that isolates the market in relation to the neighborhood Sant Gervasi-Galvany.

Although the design exercise of this work is to link the market with the city through the public space, it is considered necessary an understanding of the context in which the design of this public space will be immersed and also of the Galvany market since it is the public facility to which this context is going to be linked.

4.2.1 UNDERSTANDING THE CONTEXT: SARRIA - SANT GERVASI

The quartier Sarria-Sant Gervasi is located in the north of Barcelona near the Collserola mountain, it is mostly residential area with a large number of schools (mostly private) and is one of the greenest districts of the city. The district is the combination of old municipalities added to Barcelona like Sarrià (1921), Vallvidrera-les Planes (annexed to Sarrià in 1890) and Sant Gervasi de Cassoles (1897)[46].

This quartier is divided in six neighborhoods which are Sarriá, Sant Gervasi - la Bonanova, les Tres Torres, el Putxet i el Farró and Sant Gervasi Galvany.

The Galvany Market is located in Sant Gervasi-Galvany (figure 53), the neighborhood which is in the south of the quartier and is the closest to the city center, it is between Diagonal Avenue and Ronda del General Mitre. The name of the neighborhood became popular when the market was named Galvany after the original owner of the land Jose Castellon and Galvany[47].

46 Noguera, J., 2011. *Modelo Barcelona: Diseño Urbano y Espacio Público. La peatonalización alrededor de los mercados municipales del siglo XIX*. Barcelona: Universitat de Barcelona.

47 Ajuntament de Barcelona, n.d. *barcelona.cat*. [Online] Available at: http://lameva.barcelona.cat/sarria-santgervasi/ca/historia-del-barri-de-sant-gervasi-galvany [Accessed 13 January 2017].

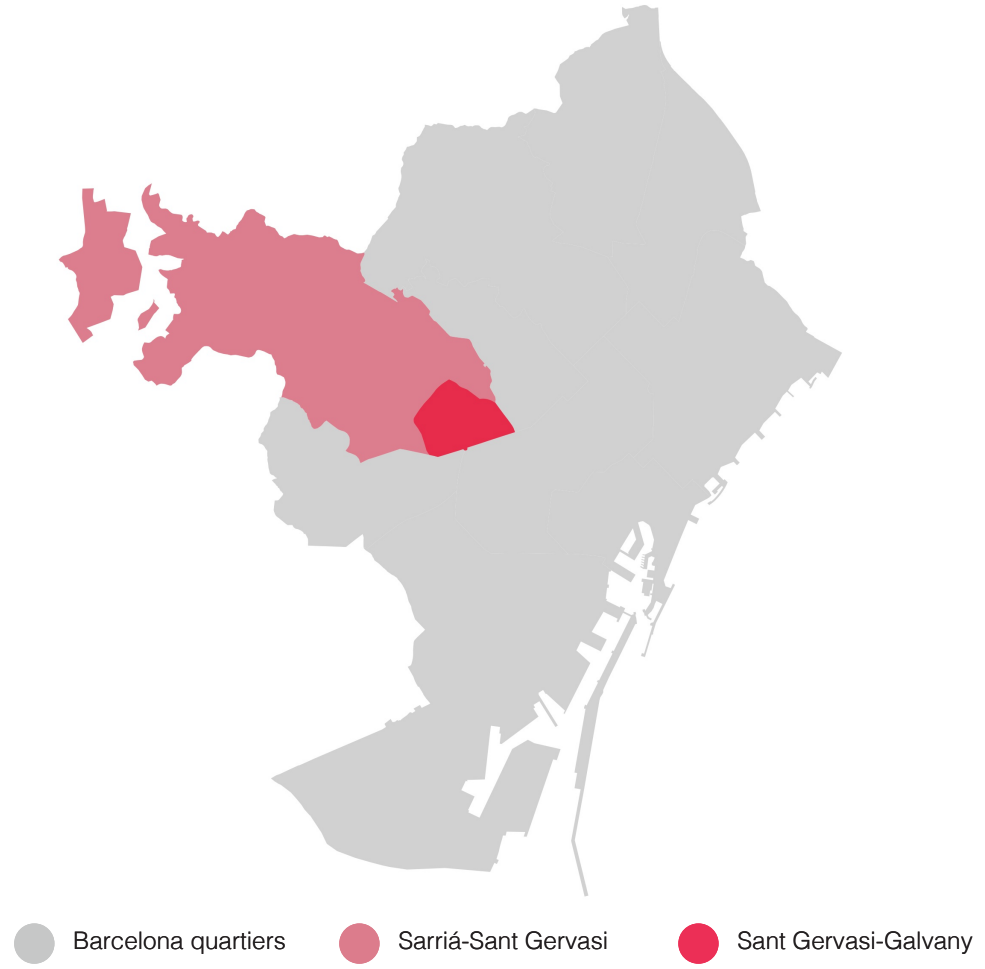


Figure 53. Barcelona quartiers. Source: CartoBCN.

In Sant Gervasi-Galvany there are some important green spaces, among them Turó Park (figure 54), Monterols Park and Moragas Park (figure 55), they are considered the green islands of the neighborhood (figure 56). It is a high economic activity quartier, this could be seen in the Carrer dels Madrazo, a commercial street with many specialized commercial shops and also in Carrer de Muntaner.

Figure 54. Turó Park. Source: turrobcn.com

Figure 55. Moragas Park. Source: Alex Brown.

Figure 56. Green islands of Sant Gervasi-Galvany.

Figure 57. Galvany Market. Source: IngoIFBLN.

4.2.2 UNDERSTANDING THE CONTEXT: GALVANY MARKET

Count Galvany give the site as an offering to build a covered market that would house the existing open-air market of fishermen and peasants. The Galvany Market began its construction in 1868 and its definitive inauguration was in the year 1927[48]. This isolated typology market is located in a full block with a perimeter wall that separates it from the neighborhood. The building which is listed as an artistic monument comprises a Greek cross with a central dome, metal structure and brick facades with modernist windows (figure 57). It has four main accesses from Carrer d'Amigó, Carrer de Calaf, Carrer de Santaló and Carrer dels Madrazo and three secondary accesses that are mostly used by people who use the market parking lot. The market is covered within the public transport network with nearby stops of line 6 Reina Elisenda, tram stops on Avenida Diagonal, and bus stops in Santaló-Mercat Galvany, Calvet-Tenor Viñas and Muntaner-Laforja (figure 58). It is important to mention that there is commercial activity in the ground floors of the frontal buildings of the market which is an significant aspect for the vitality of the project as it can be seen in the images, also the parking is allowed in all the market's perimeter (figure 59-60).

48 Ajuntament de Barcelona, n.d. *barcelona.cat.* [Online] Available at: http://ajuntament.barcelona.cat/mercats/es/content/mercado-de-galvany [Accessed 13 January 2017].

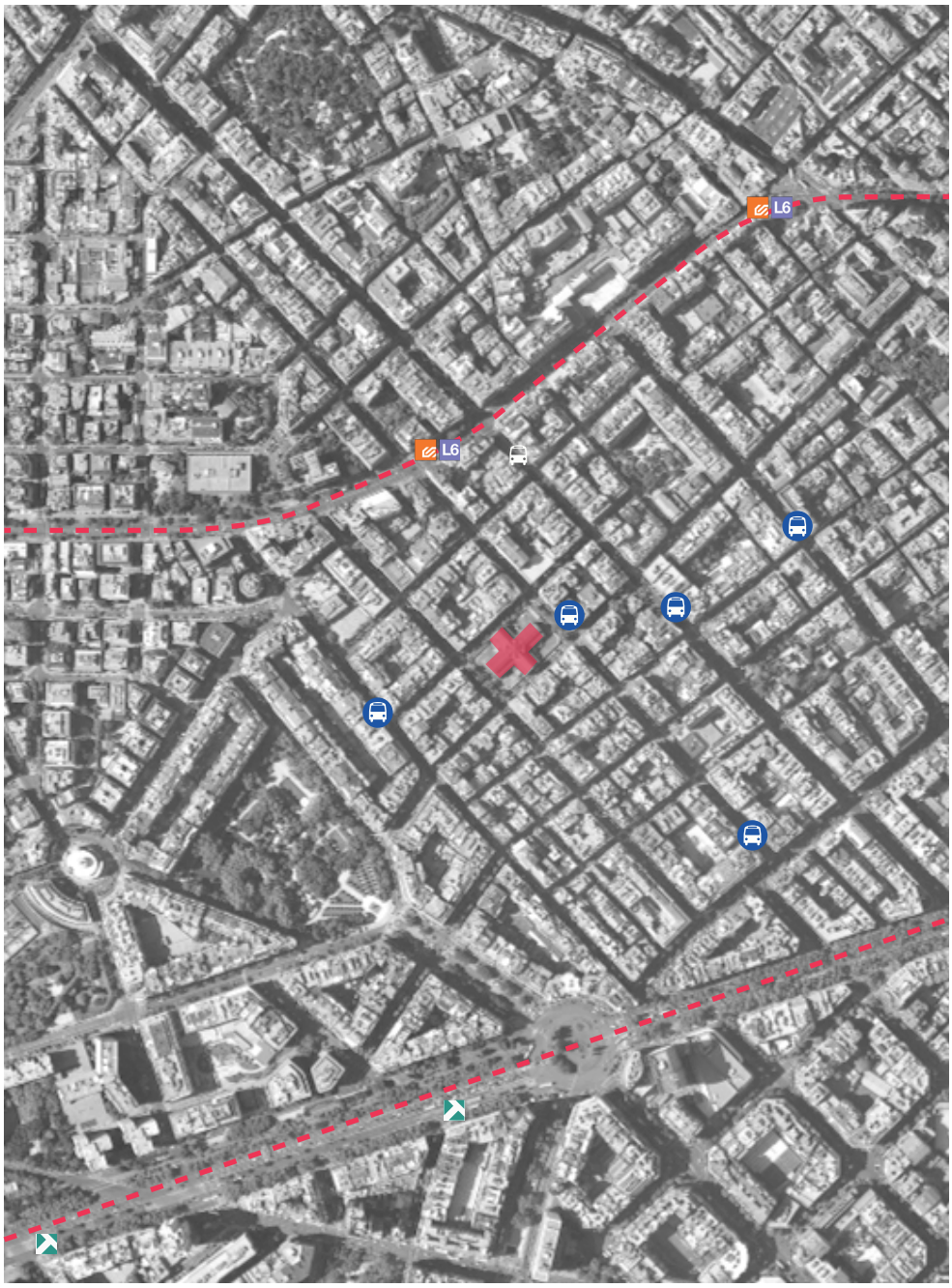


Figure 58. Public Transport around Galvany Market. Source: Google maps.

Figure 59. Commercial activity in the surrounding area

Figure 60. Commercial activity in the surrounding area

4.2.3 PERMEABILITY AS A DESIGN STRATEGY

In order to illustrate the process that has been carried out, this section presents the decisions and strategies of the project and the mapping of the permeability, but this process has not happened neccesarily in that order, but in a coming and going from maps to decision making in design and vice versa. The most important matter in the process has been that the permeability has been used for the design of a public space, the same that can be approached in a different way according to the interpretation of who does it.

The features of permeability: porosity, viscosity and pressure have been a useful resource for understanding the case study presented in the second chapter and also for the proccess of designing which will be explained below.

As mentioned in previous chapters and if we relate to the project of the case study of this work, L'illa Diagonal shopping center; the proposal of the public space that links the Galvany market with the urban fabric of the city embraces the increase of the permeability creating an open space, active for people with a variety of opportunities in pedestrian flows and with a greater number of activities on the ground floor; which will not only increase commercial activity but also the social activity through useful spaces. In this way the design of this final master's project will act as the link that ties the Galvany Market with the city through the public space having as a focal point the pedestrian and the relationships that can generate in it. Instead of having an commercial facility (Galvany Market) opened at certain times of the day, the proposal creates a public urban space with activities that attract people and promote opportunities to buy, socialize, coexist and increase the sense of identity that the inhabitants feel for the neighborhood.

As a starting point, it has been identified a main axis in the direction Llobregat - Besos that has a different feature in the project, is the Carrer de Calaf, located in the northern part of the Galvany Market towards Corserolla (figure 61). This axis will be a public space different from the rest of the project, as it can be seen in the permeability maps[49] the pedestrian walkway acts as a link between the green islands of Sant Gervasi-Galvany, the Turó Park and Moragas Park; this is an axis through which the porosity spreads until it reaches the other public spaces (Turó and Moragas Park) and links them

49 The permeability maps of the current situation and the proposal are presented in the next section.

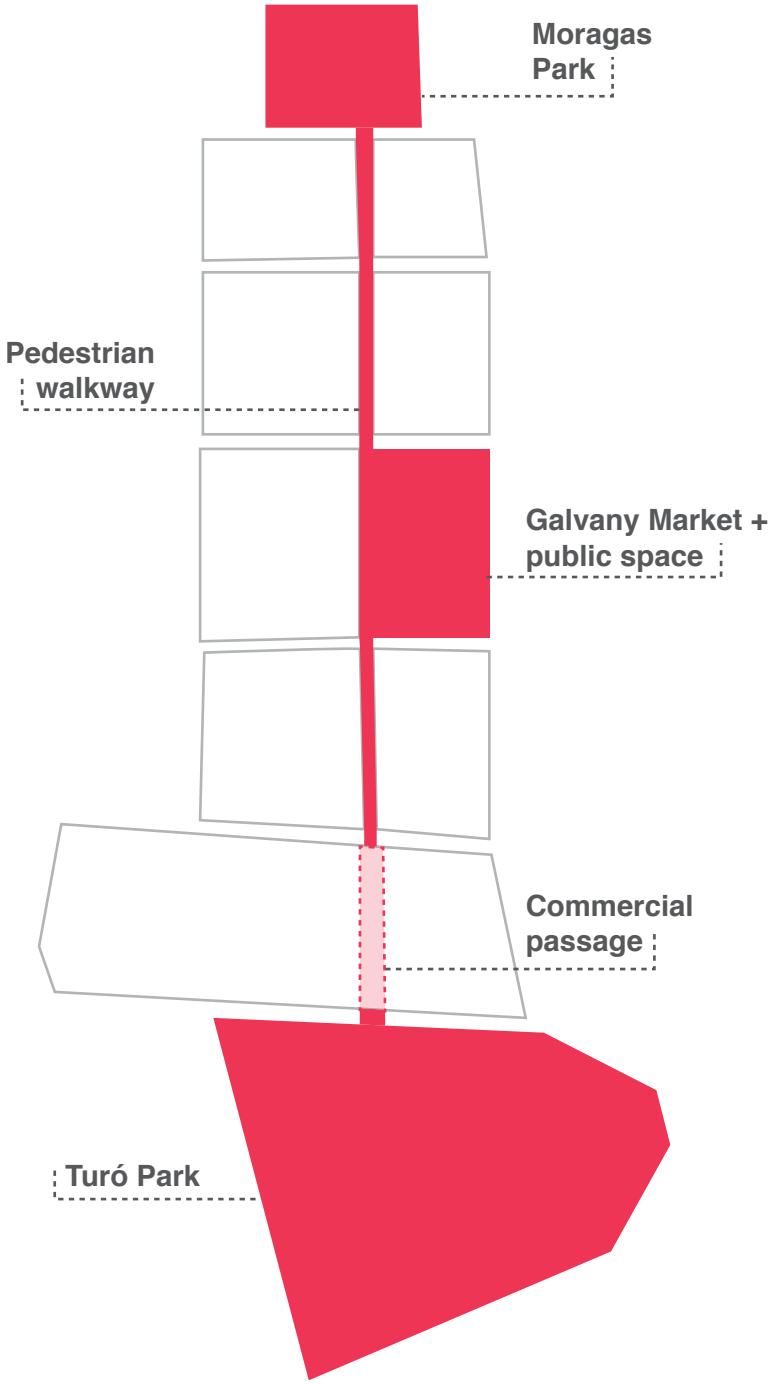


Figure 61. Main strategies for the project

to the market. Also, in order to arrive to Turó Park the connection will be through a commercial passage which will pass through the block between Carer de Calvet and Ferran Agulló.

The other roads: Carrer d'Amigo, Carrer dels Madrazo and Carrer de Santaló become spaces with characteristics of the streets of 'convivencia'[50] which means coexistence or shared space in which there is no physical separation between user types and becomes the cohabitation that will dynamize the neighborhood. This means a street that is an authentic public

50 Generalitat de Catalunya. Departament de Política territorial i Obres Públiques, 2008. *Manual para el diseño de vías ciclistas de Cataluña.* Barcelona: Generalitat de Catalunya.

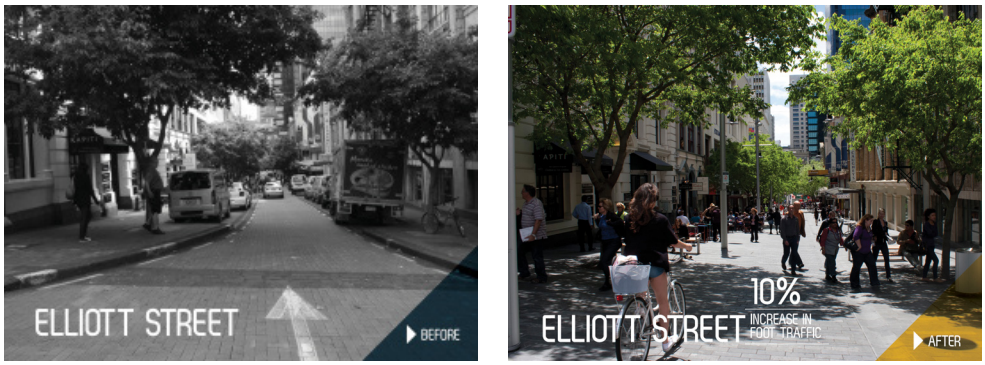


Figure 62. This strategy has been applied in Auckland's Shared Space programme turns streets into places. Before and after Elliott Street in Auckland transformed to shared street. Source: Vienncouver.

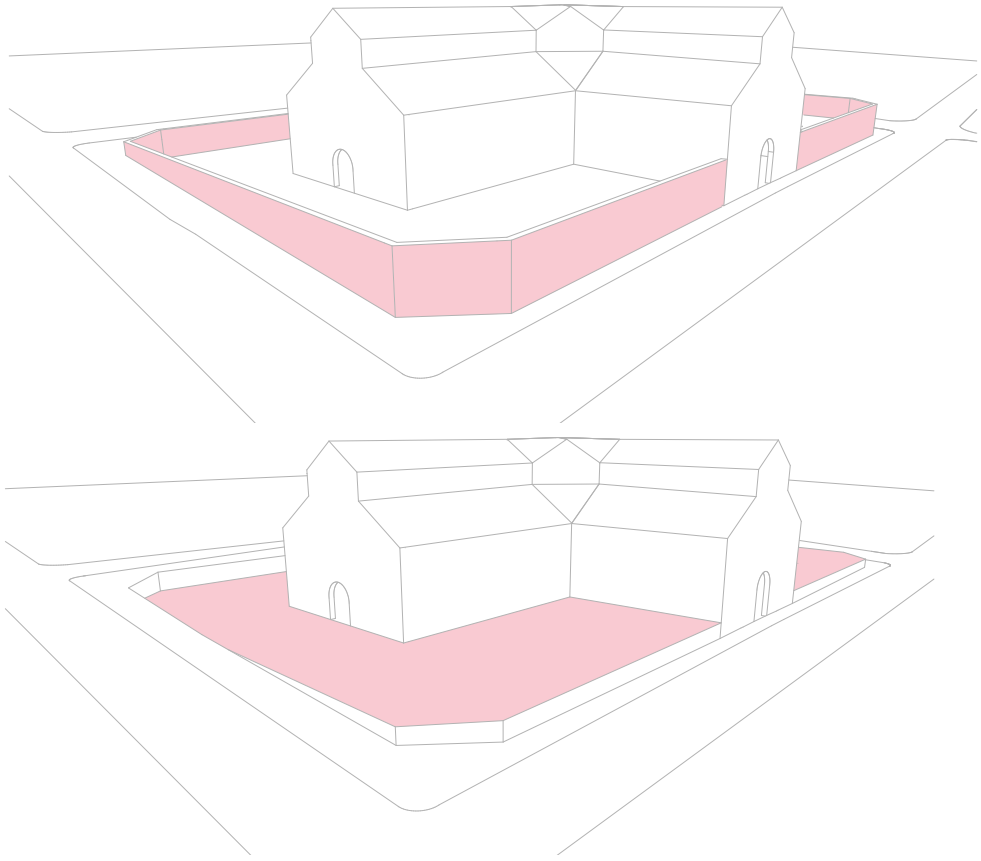


Figure 63. Strategy of eliminating the walls and keeping the platform.

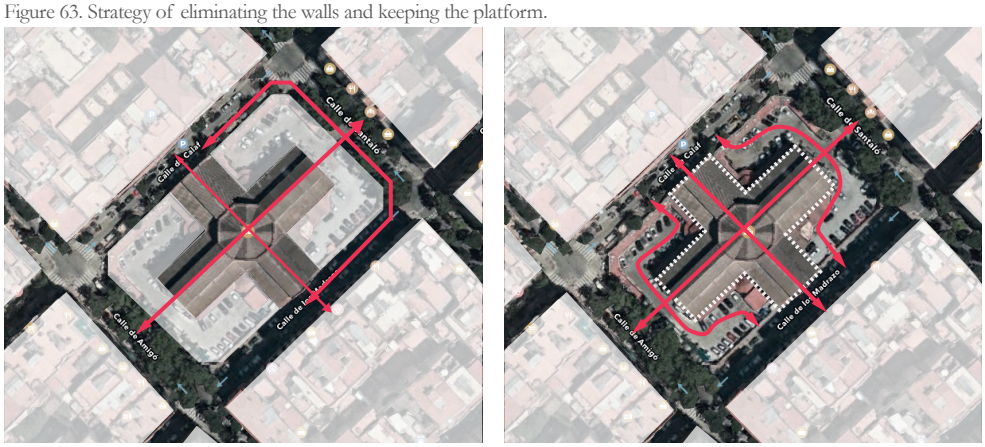


Figure 64. Circulation scheme before and after. Source: Google maps.

space because it acts as a meeting point, place of play, area to walk but without impeding the car circulation but giving the vehicle a secondary role in relation to pedestrians (figure 62). This action increases the area of public space for pedestrians and the creation of activities; In addition, the entrance to the Galvany Market can be improved and characterized avoiding the existing blockades of the vehicles.

The project also proposes the elimination of the existing walls that isolate the Galvany Market (figure 63), maintaining the existing platform they currently limit and using it to create a permeable market square, which is elevated in comparison to the Carrer dels Madrazo but at the same level of market entrance, being visually permeable in the part of the Carrer dels Madrazo and physically permeable towards the accesses in Carrer d'Amigó and Santaló.

This square can be the space for festivals, temporary markets, concerts, exhibitions, etc., in addition urban furniture is located that acts as a limit but without being a barrier to the permeability, this furniture is a longitudinal bench along the Carrer dels Madrazo and its intersections from which you can see what happens in the market and in the neighborhood. When implementing this square, the possibilities of circulation within the block where the Galvany Market is located increase significantly (figure 64). In addition, it will be the lobby of the market and of the proposed activities that are explained in the next section.

Due to the topography difference between the Carrer de Calaf and Carrer dels Madrazo, which includes a difference of one floor, the space it generates has been used to locate the shops that activate the public space, increasing the pressure as attractive force of the people into the space. These are located at the bottom of the Carrer de Calaf and face the square where the terraces of these shops are placed which are also directly linked to the Market through the side doors. By keeping the platform-plaza that is lower with respect to the Carrer de Calaf's level, the pedestrian walkway becomes a balcony of the market from which you have views that are currently blocked by the perimeter wall (figure 65-66).

Finally, as connectors that also add viscosity to the space, a staircase is located on each side of the project located parallel to the Carrer d'Amigó and Santaló, which connect the platform-plaza and the access to the market with the pedestrian walkway.

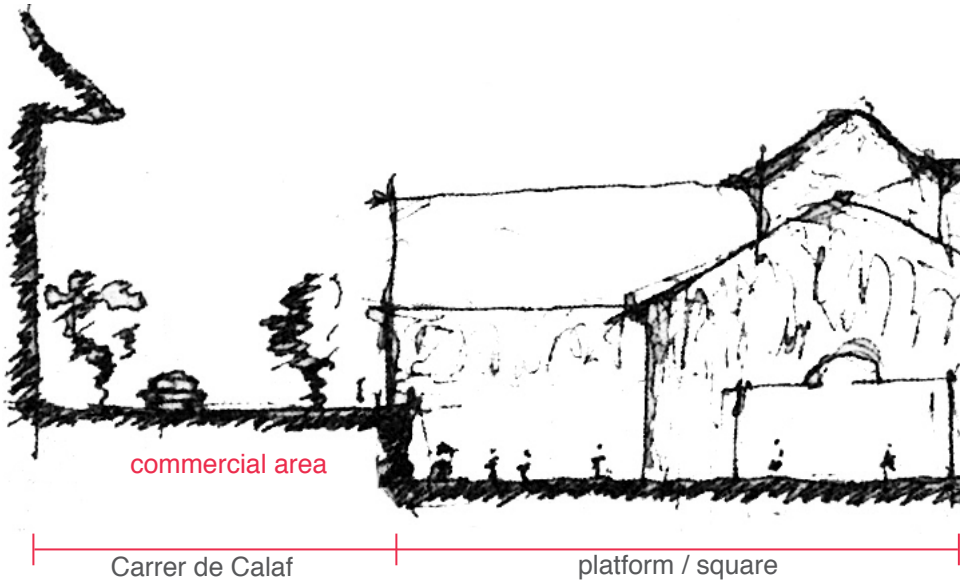


Figure 65. Schematic section Carrer de Calaf and the relation with the square.

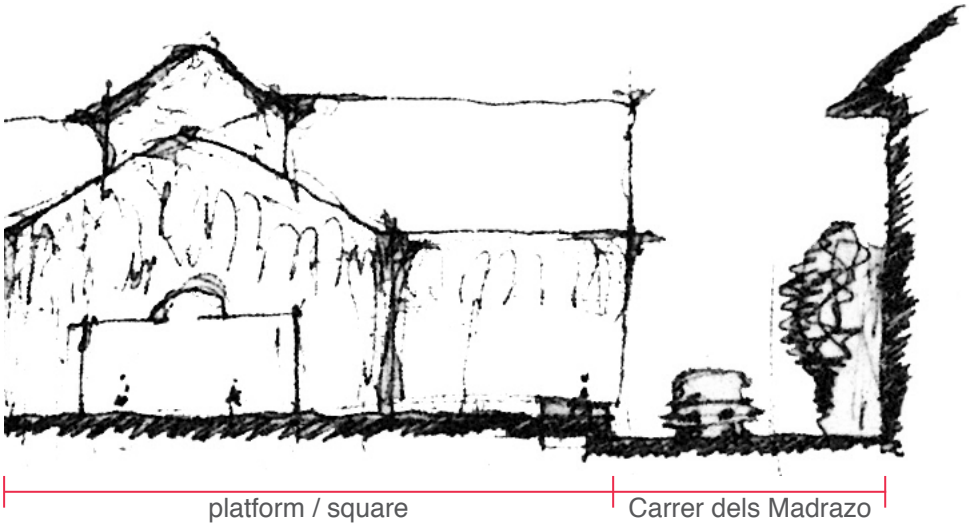


Figure 66. Schematic section platform above Carrer dels Madrazo.

Although the intention of this work is not about the renewal of the Galvany market as it would be the subject of another research, it proposes a minimal intervention in the entrances from the square increasing the visual permeability and creating active edges that attract the people to enter to through corten steel and glass frame that allows the interior - exterior visual connection.

Being the Galvany Market a building classified as an artistic monument and considered one of the most important markets of the city for its aesthetic value, the project seeks to enhance its protagonism with respect to the context, releasing the barriers that currently cover it and leaving it for the contemplation from the city.

In the next section the permeability maps are presented using the same methodology as in the case study. But in the case of the project it has been developed a current situation map and a proposal map of the porosity, viscosity, pressure and permeability, in order to understand how the area is working and also the desired permeability as a tool for the design. This procedure has been resourceful to compare and take decisions for the project. Together with this maps, it will be presented a close up of the Galvany's market block where the public space project is developed in order to see how the permeability aspects have been part of the design process.

And finally in order to show how the space is conformed a perspective of the project is shown which will allow a good understanding of the decisions taken; the idea is to illustrate how the people could use the space if the permeability would change in the area.

It is important to say that the process mentioned in this section has not been a linear sequence, but rather a back and forth sequence in which both the design process and the illustration of the permeability maps have been affected by each other. In addition, it is necessary to understand that the decisions made for the design and the maps are only a personal interpretation of the urban permeability in the area, which can be approached differently according to different interpretations but nevertheless the presented concepts could be maintained.

Pedestrian flow

Figure 67. Walk outside of the market.

Figure 68. Pedestrian crossings.

If the existing circulations of the area are analyzed, it can be observed that besides the people who enter to buy in the market, it works in a tangential form to the Galvany's block due to the walls which do not allow access to the Market neither physically nor visually from most of the area (figure 67). Also it can be seen that the pedestrians are only able to walk through the existing sidewalks and the crossings are limited to the corners of every block (figure 68). It should be noted that in order to develop the pedestrian flow map (figure 69) it has been considered that the market is open, given the case it would not be open, people would move only around the block and could not access to the block in any way.

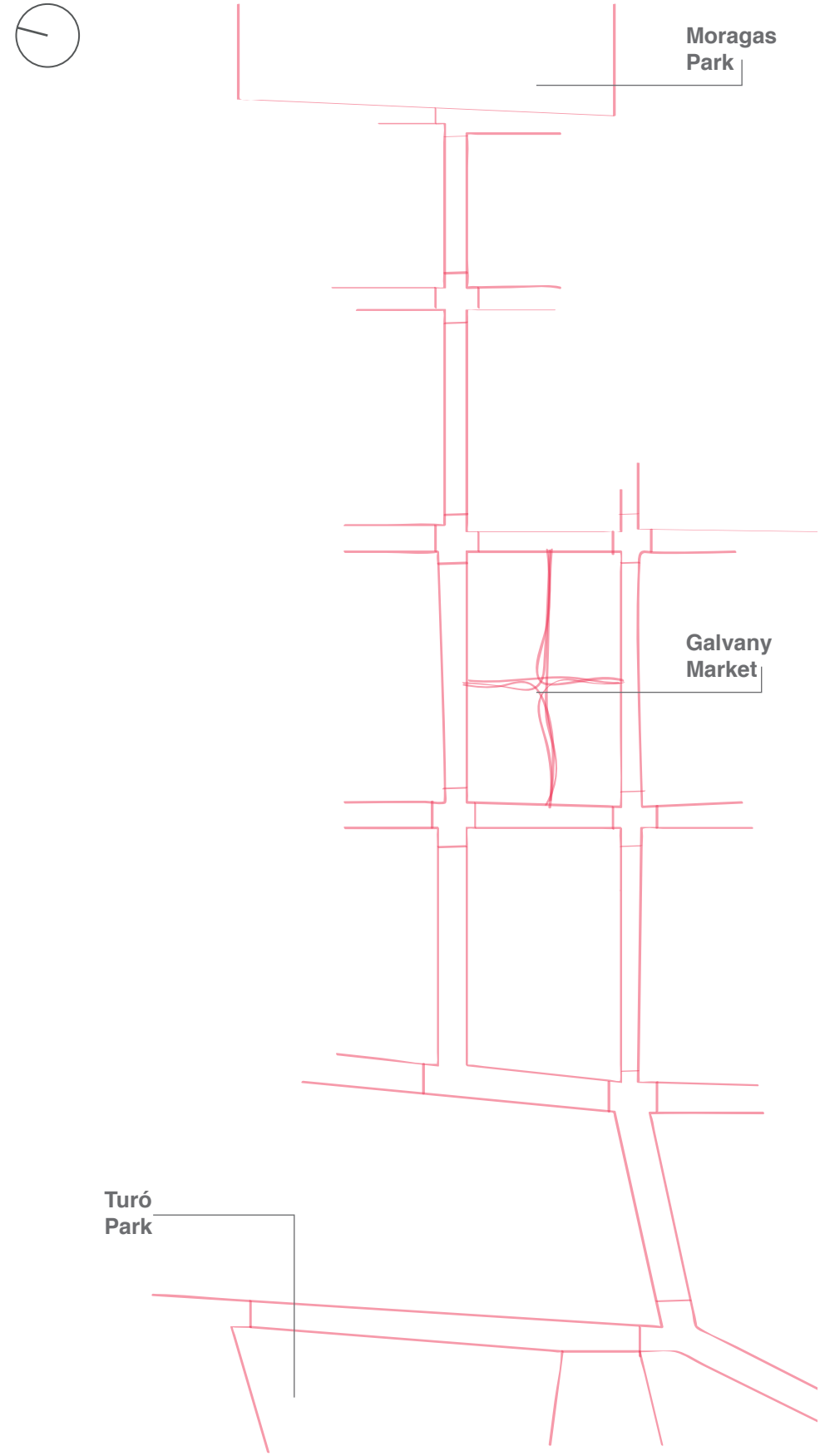


Figure 69. Current pedestrian flow map.

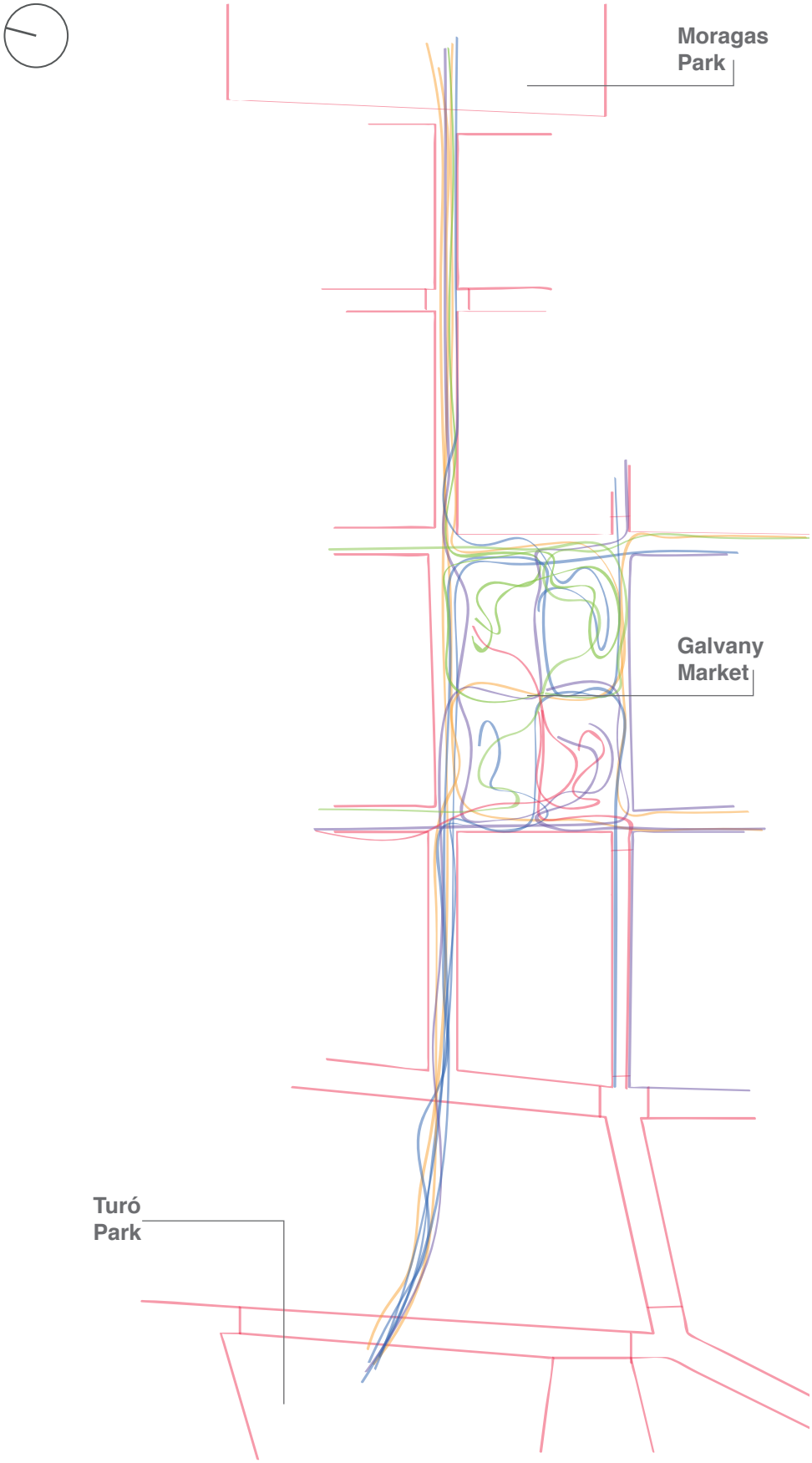


Figure 70. Proposal pedestrian flow map.

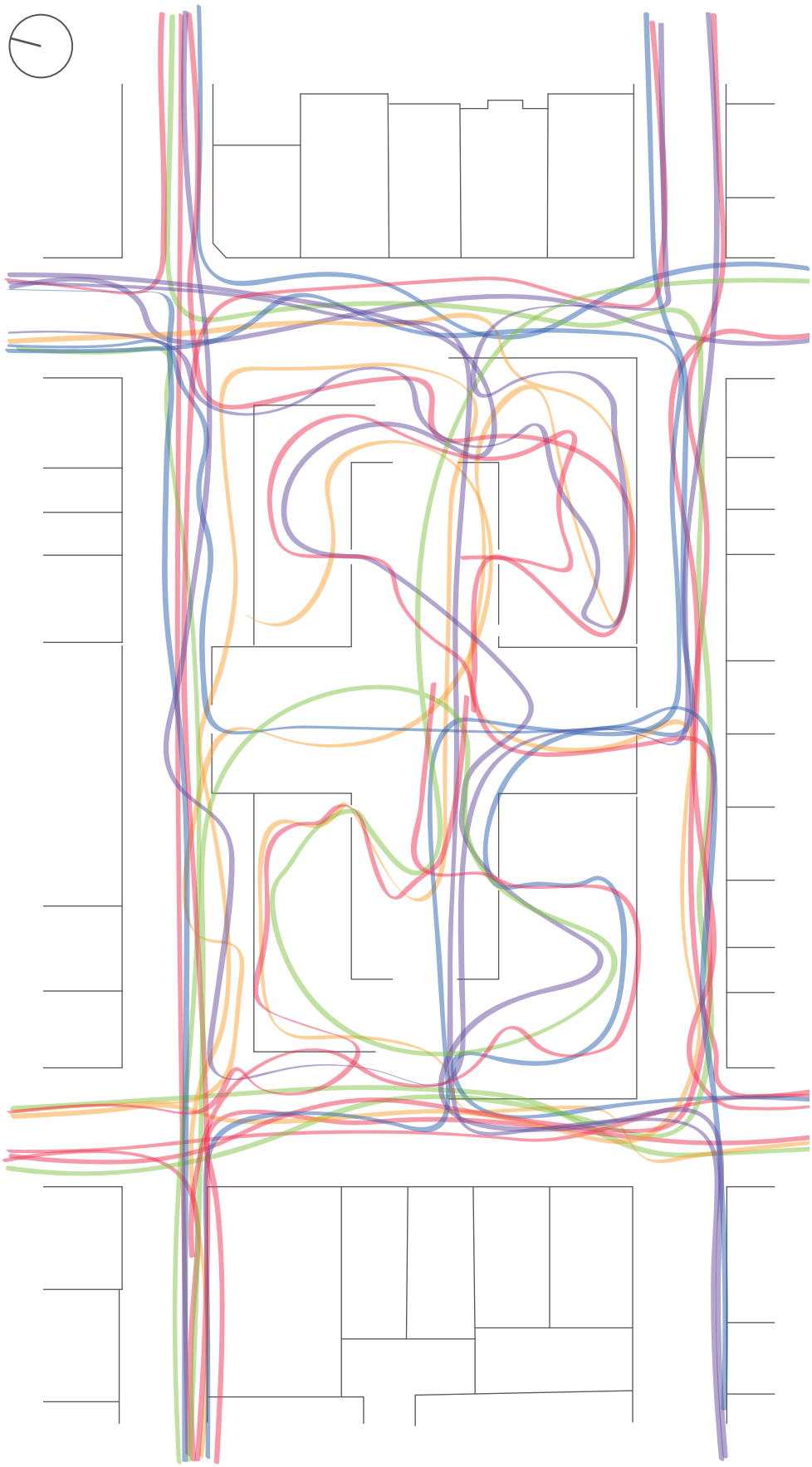


Figure 71. Pedestrian flow proposal in the public space.

In the proposal (figure 70) of the pedestrian flow map the idea is to increase the number of options for the people to move around the area so it will enhance the experience in the pedestrians. While opening the market to the public space also the paths of connection between the all the sides of the market grow making of the Galvany Market also a space of circulation which makes it more crowded benefiting the sellers (figure 71). Also, with this decision the possibilities grow not only inside the Galvany's market block but also along the connection between Moragas and Turó Park therefore the commercial facilities of the zone will boost their opportunities to sell.

Porosity

Figure 72. Parking of the Galvany Market.

In terms of porosity, the most porous areas as it can be observed in the current map are the public spaces of the zone which are the Moragas and Turó Park; but also the sidewalks are porous spaces because is where the people can circulate. Also it has been found that the interior of the Galvany Market is a porous space where the users can move freely while the market is open, leading to a 'big pore' where people gather and get together. Even though is only open some hours a day, in these time the market is a walkable area that people use as a meeting point and shopping, however as it can be observed the porosity decrea-

Figure 73. Parking outside the Galvany Market.

ses towards the outside because the open space which could be considered 'free' since its not built on is currently destined to the parking (figure 72). In the surrounding area happens the same, the priority is given to the vehicle over the pedestrian (figure 73) with wide spaces used for parking while having narrow sidewalks for walking. As a result (figure 74) it could be understood that there are three main 'big pores' in the zone which are isolated from the others only joined through sidewalks .

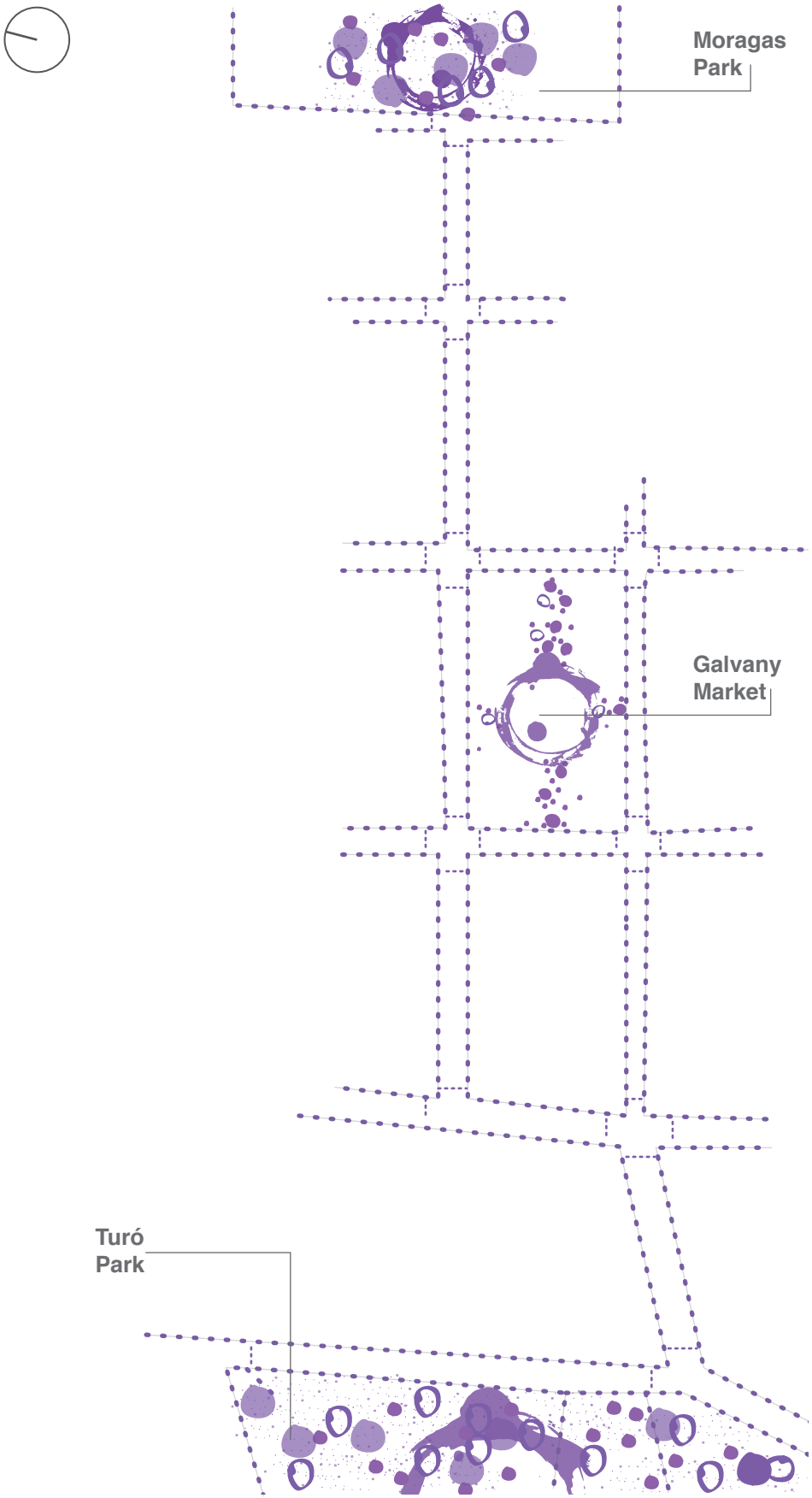


Figure 74. Current porosity map.

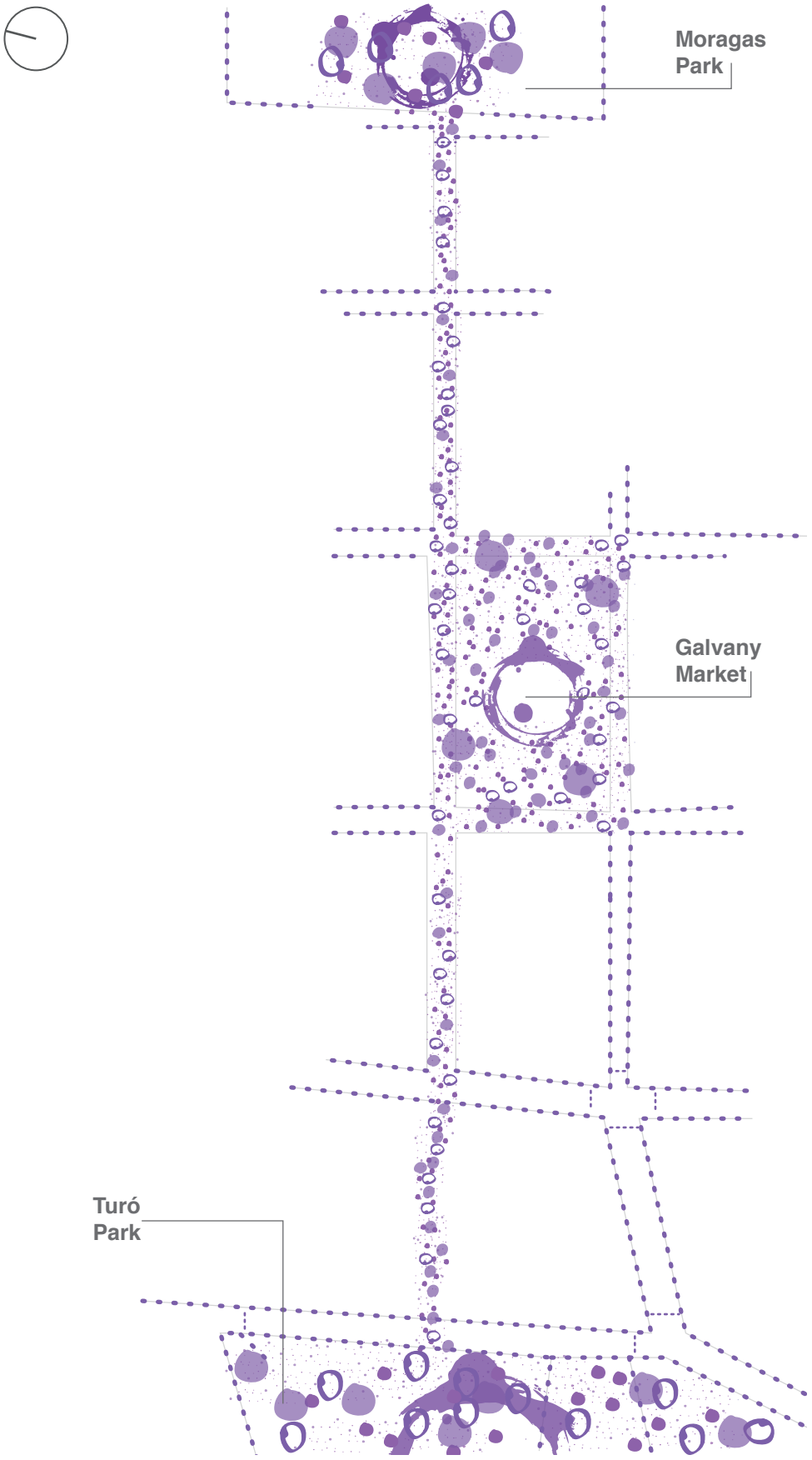


Figure 75. Proposal porosity map.

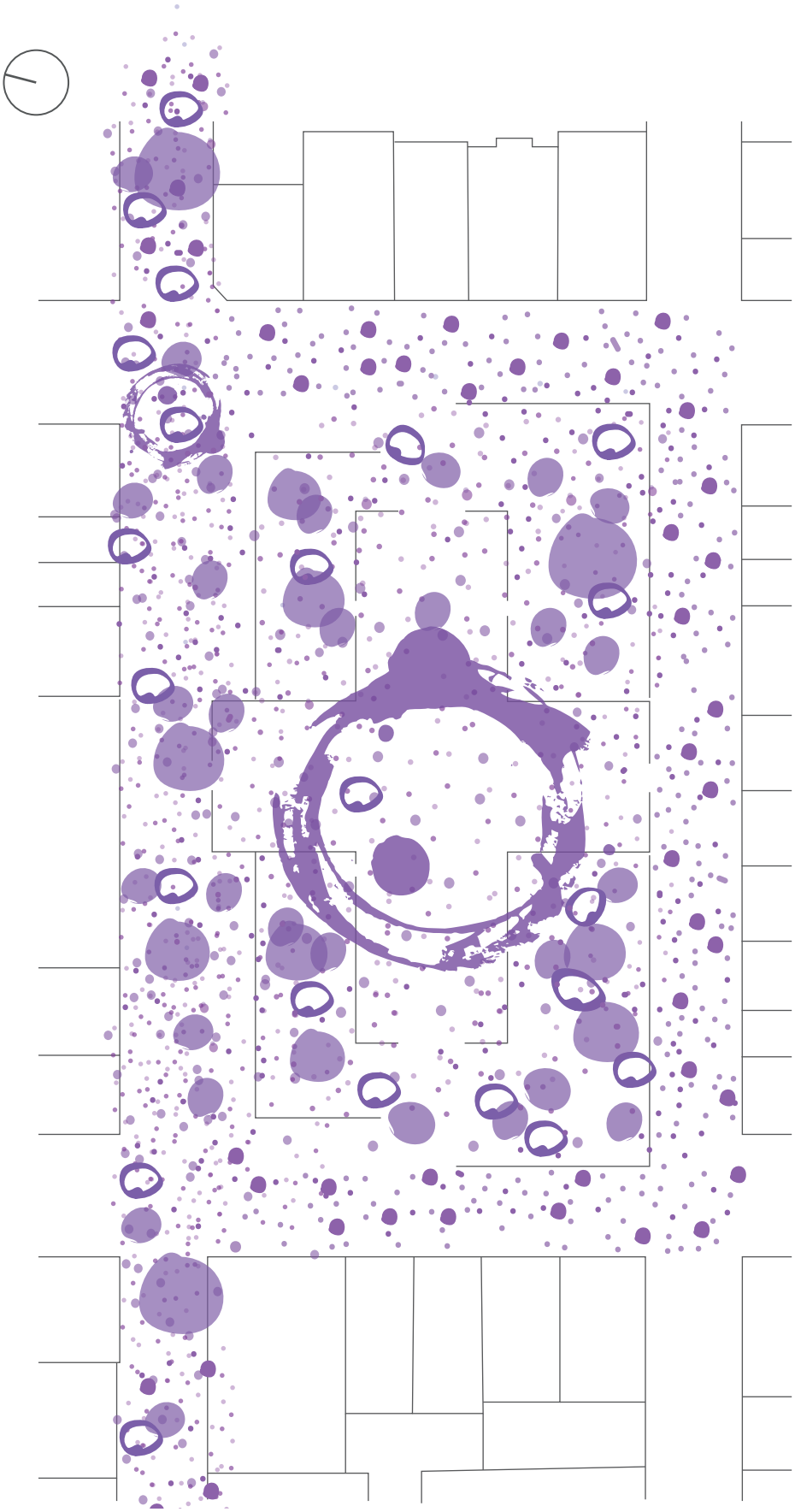


Figure 76. Proposal porosity in the public space.

In the proposal porosity map (figure 75) the porosity increases mostly in the surrounding of the market and also along the Carrer de Calaf which will be the link between the public space around the Galvany Market and the Moragas and Turó Park (figure 76-77); creating a porous zone where pedestrians are the main actor but with strategies which would also include the other group users which will be explained later in this chapter. Also with the creation of the commercial passage the porosity extends through the block and creates the continuity that is needed to connect with the Turó Park.

Figure 77. Porosity through the pedestrian walkaway which links Turó and Moragas Park.

Viscosity

Figure 78. Carrer de Calaf. Source: Google street view.

Figure 79. Carrer d'Amigó. Source: Google street view.

If we analyze the viscosity of the space in the current situation, it can be observed that the fronts of some buildings across the market and along Carrer de Calaf have some small viscosity due to the setbacks in the ground floor but the market wall as well as most of the area are linear and continuous with no viscosity (figure 78).

As for changes in level, the topography of the neighborhood which is a continuous slope towards Collserola Park, makes the market to be placed on a ramp street with a level change of around 3 meters between Carrer dels Madrazo and Carrer del Calaf (figure 79), a feature that can be exploited at the moment of designing for the creation of new spaces with the topography.

In the viscosity map of the current situation it can also be observed that at the end of Carrer de Calaf on Moragas Park, the buildings which surround the public space create a viscosity in the space diverting the routes of the pedestrian (figure 80).

Even though the walls of the Galvany Market also are features wich lead the pedestrian flow, as mentioned above, in a tangencial way to the block, this viscosity is not the kind of viscosity intended in the project because it does not lead the people to any desired space but rather keeps them away or outside of the market, which is the opposite of the intention of this project.

Figure 80. Current viscosity map.

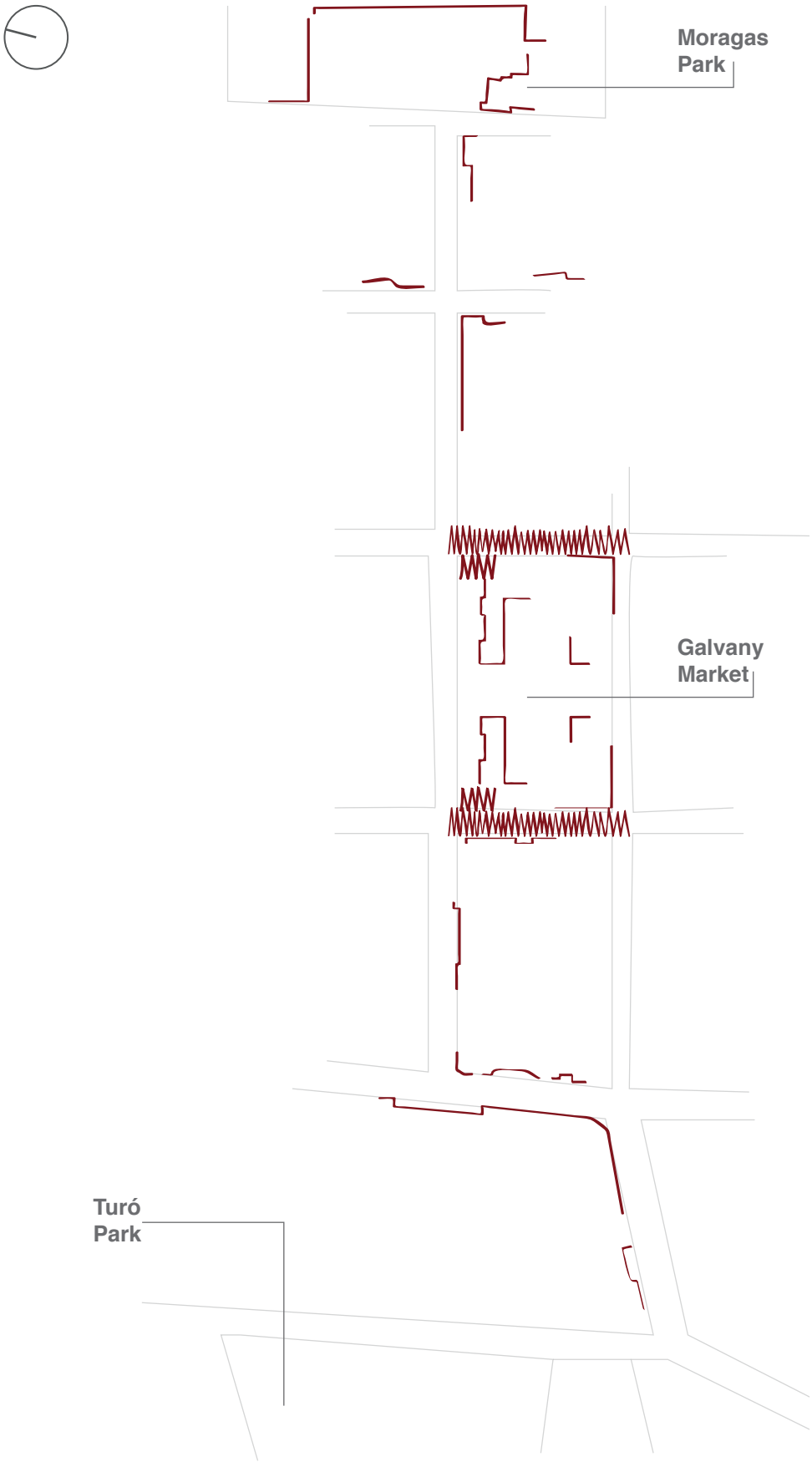


Figure 81. Proposal viscosity map.

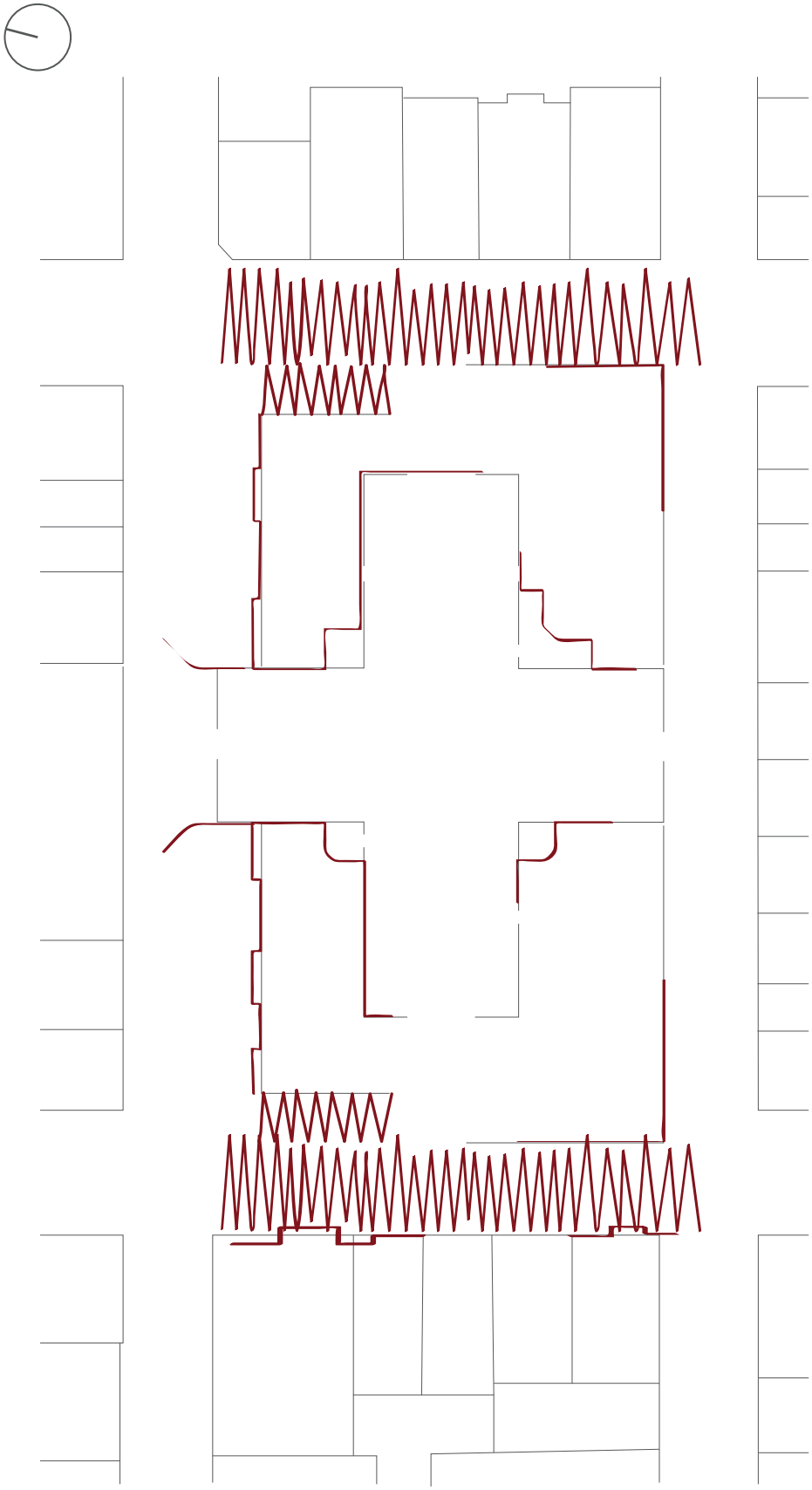


Figure 82. Proposal viscosity in public space.

In the proposal viscosity map (figure 82) the aim is to take advantage of the change of levels in the topography and create elements which will add stickiness to the project, also take advantage of this situation to implement a new built area for commercial facilities which will add liveness to the project in different hours and also make use of the terraces in the open public space. In adittion by releasing the space off the market walls, will lead to the creation of a more sinous space with turns and change of directions which encourage the people to make use of the space comparing to the existing walls which keep the users outside of it (figure 82-83).

Figure 83. Viscosity in the public platform/square around the Galvany Market.

Pressure

Figure 84. Commercial activity around the market.

Finally, the variety of activities on the ground floor is present around the market and all along the area which contribute to the vitality of the neighborhood as do the shops inside the market (figure 84-85); but it is important to mention that the block of the Galvany Market has no activity in the ground floor area other than inside of the market, which lead to a break in the commercial activities of the market with respect to the surroundings, as it can be perceived there is a blank area where there are no uses that act as forces and attract people, also since the market activities have a time schedule, they do not offer a continous vitality to the neighborhood all day but mostly in the mornings (figure 86). The importance of the ground floor activity has been discussed before and is worth to mention

Figure 85. Commercial activity around the market.

that it is what keeps the city alive and adds safety to the neighborhood. While having the Galvan's Market walls as linear spaces with no activity do not add any feature to the place while the market is closed, they could become dark areas with no visibility which is not favorable for the inhabitants. In the surroundings of the market the existing restaurants or coffee shops do not have the space to open terraces on the outside due to the narrow sidewalks and the space destined to parking which also blocks the visuals to the commercial facilities.

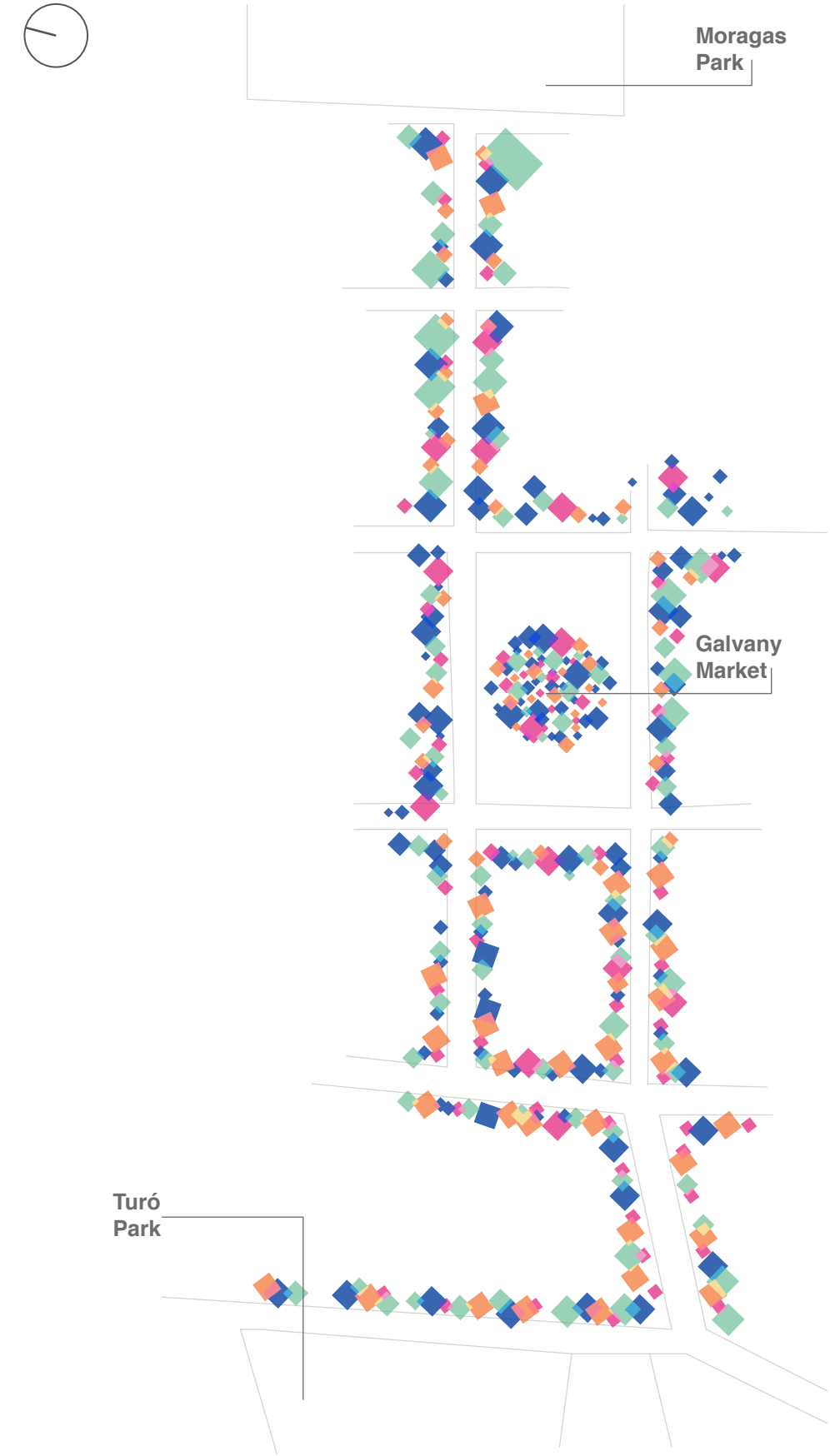


Figure 86. Current pressure map.

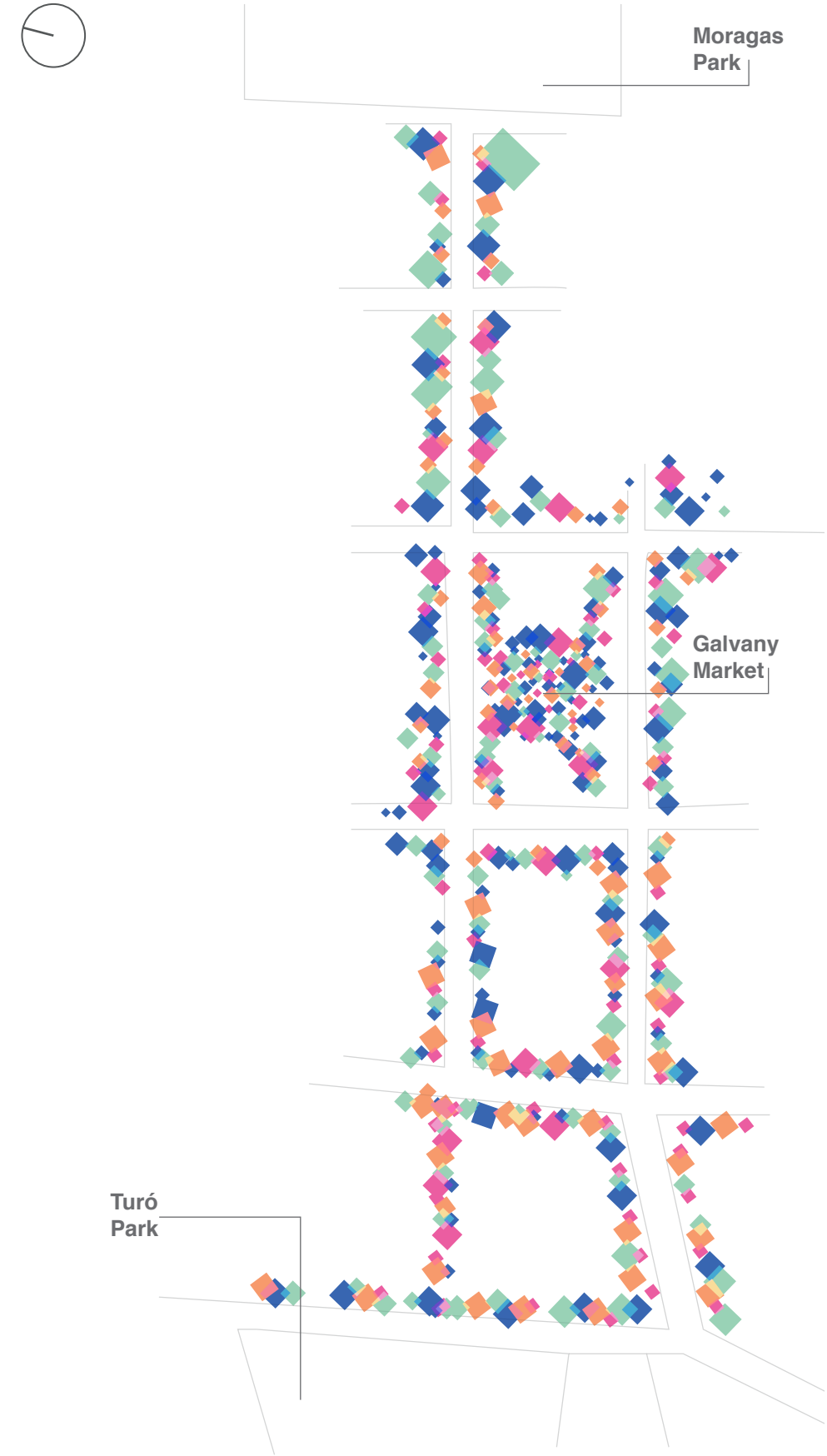


Figure 87. Proposal pressure map.

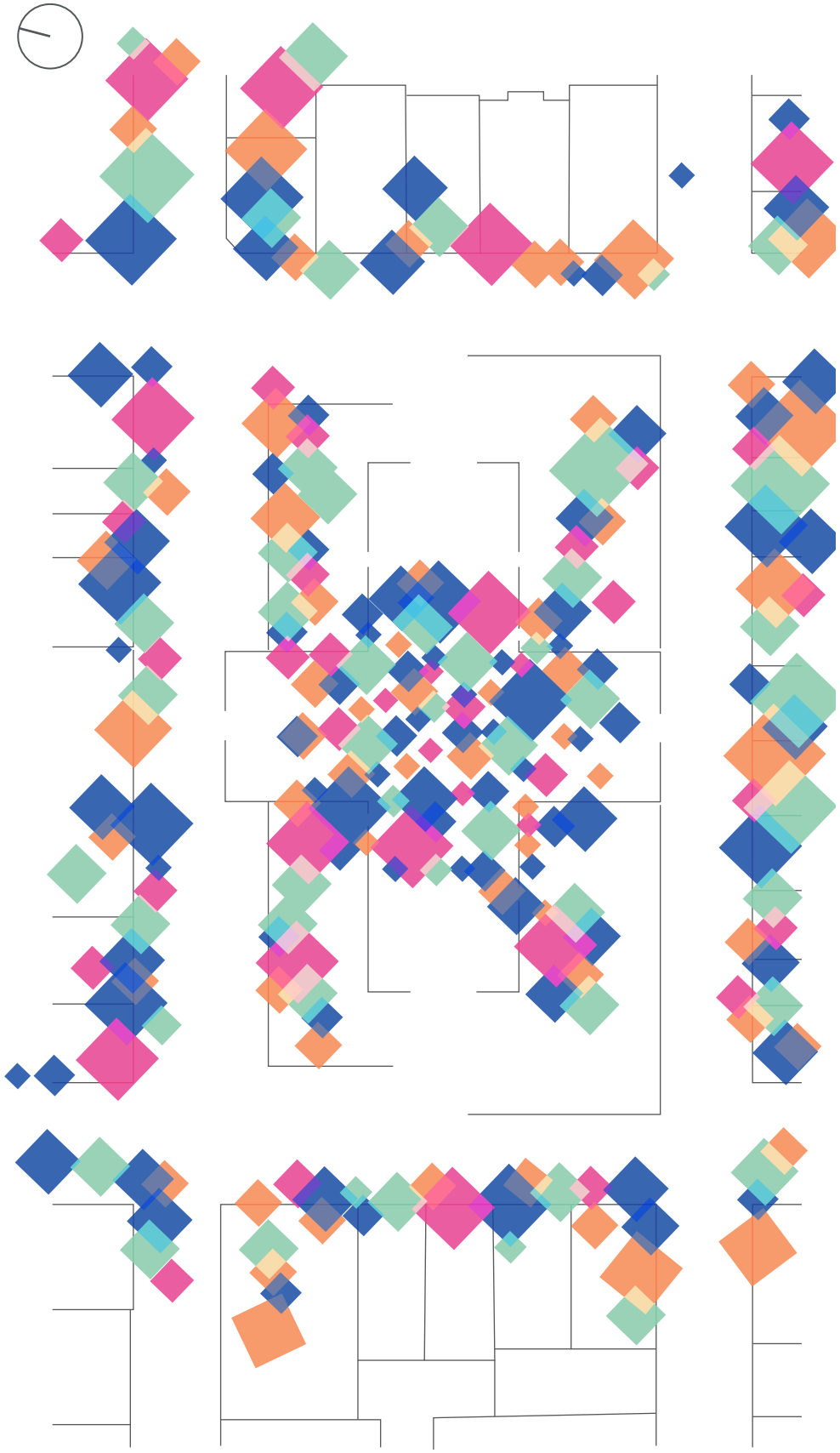


Figure 88. Proposal pressure in the public space.

While in the proposal pressure map (figure 87) the variety of activities increases in the market block area with the creation of the commercial area an dalso with the open space which is the opportunity for new activities to happen, such as festivals, flea outdoor markets, etc. Also, the commercial passage in the end of Carrer de Calaf will increase the pressure in the area. With the decisions mentioned, the vitality of the area will be improved as well as the opportunities for encounters, also the existing break between activities is now connected and the people could experience a continuity in the space while walking, buying and having another kind of activities (figure 88-89).

Figure 89. Porosity through the pedestrian walkaway which links Turó and Moragas Park.

Permeability

Figure 90. View from the intersection of Carrer dels Madrazo and Santaló.

The permeability which is the combination of the three maps explained before, illustrate the market and the surroundings behavior. The break between the market activities and the surrounding is clear and also it is evident to see how the parking affects the block by having the cars use most of the public space. As a result of the analysis, it can be determined that the Galvany market with respect to the Sant Gervasi-Galvany neighborhood is accessible only from its four entrances leading to an isolated facilitiy in terms of the neighborhood and is not linked to the urban fabric since it does not promote connections through it.

The Galvany's Market block is also active only during opening hours of the market that is normally from 7:00 am to 2:30 pm, which means that out of that

Figure 91. View from Carrer de Calaf.

time frame it does not behave as a public space in the neighborhood or in the city (figure 90-91).

In this context and with what is mentioned in the previous section on the requirements of a market to fulfill its function in the city, Galvany Market is not a place that promotes interaction between people nor acts as a public space even beyond the market opening hours.

In addition it does not have a public space that origins activities of stay, recreation or contemplation of the commercial activity. Therefore, eventhough is a public market, it does not accomplish the requirements to be considered a public space as mentioned in the previous chapters (figure 92).

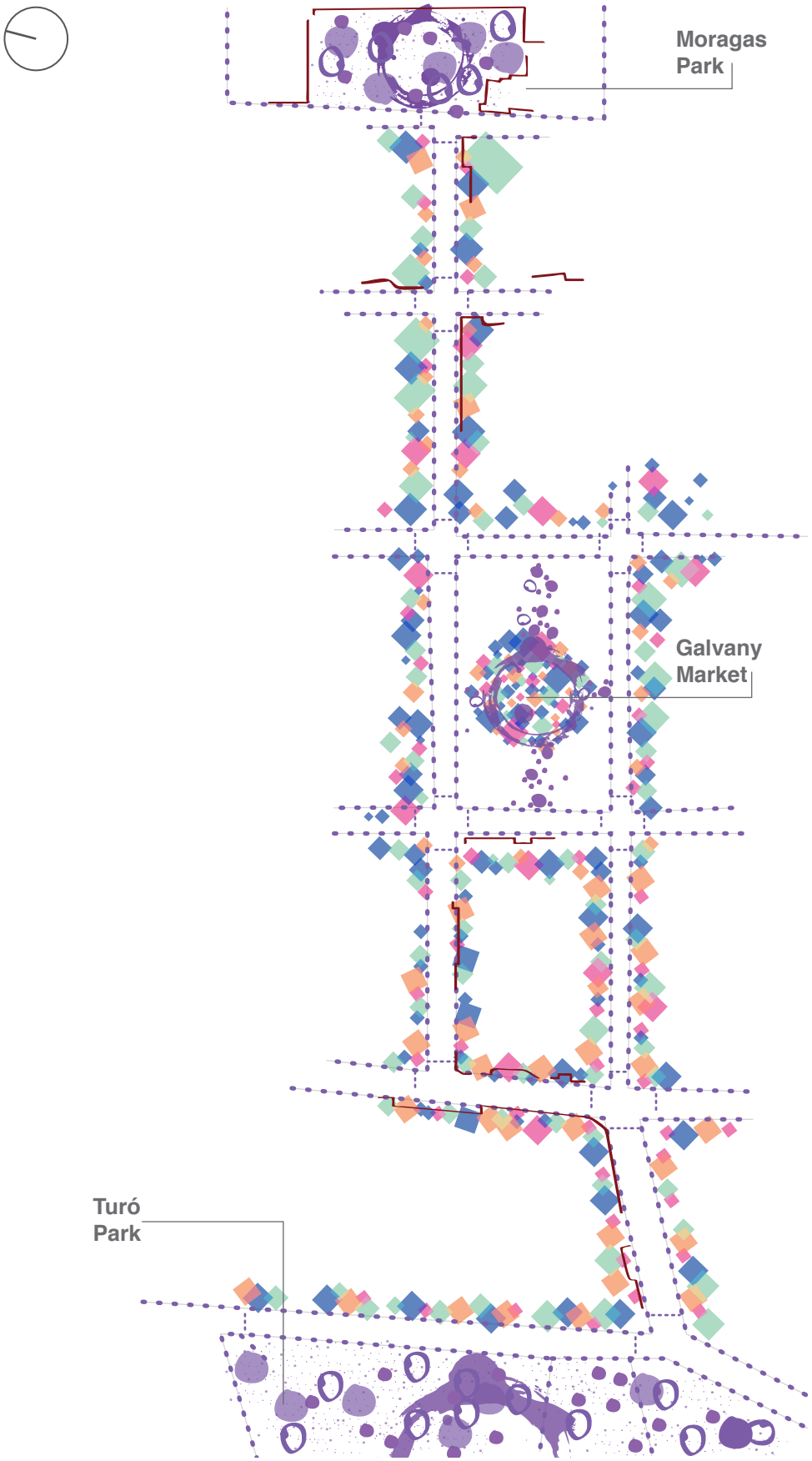


Figure 92. Current permeability map.

Figure 93. Proposal permeability map.

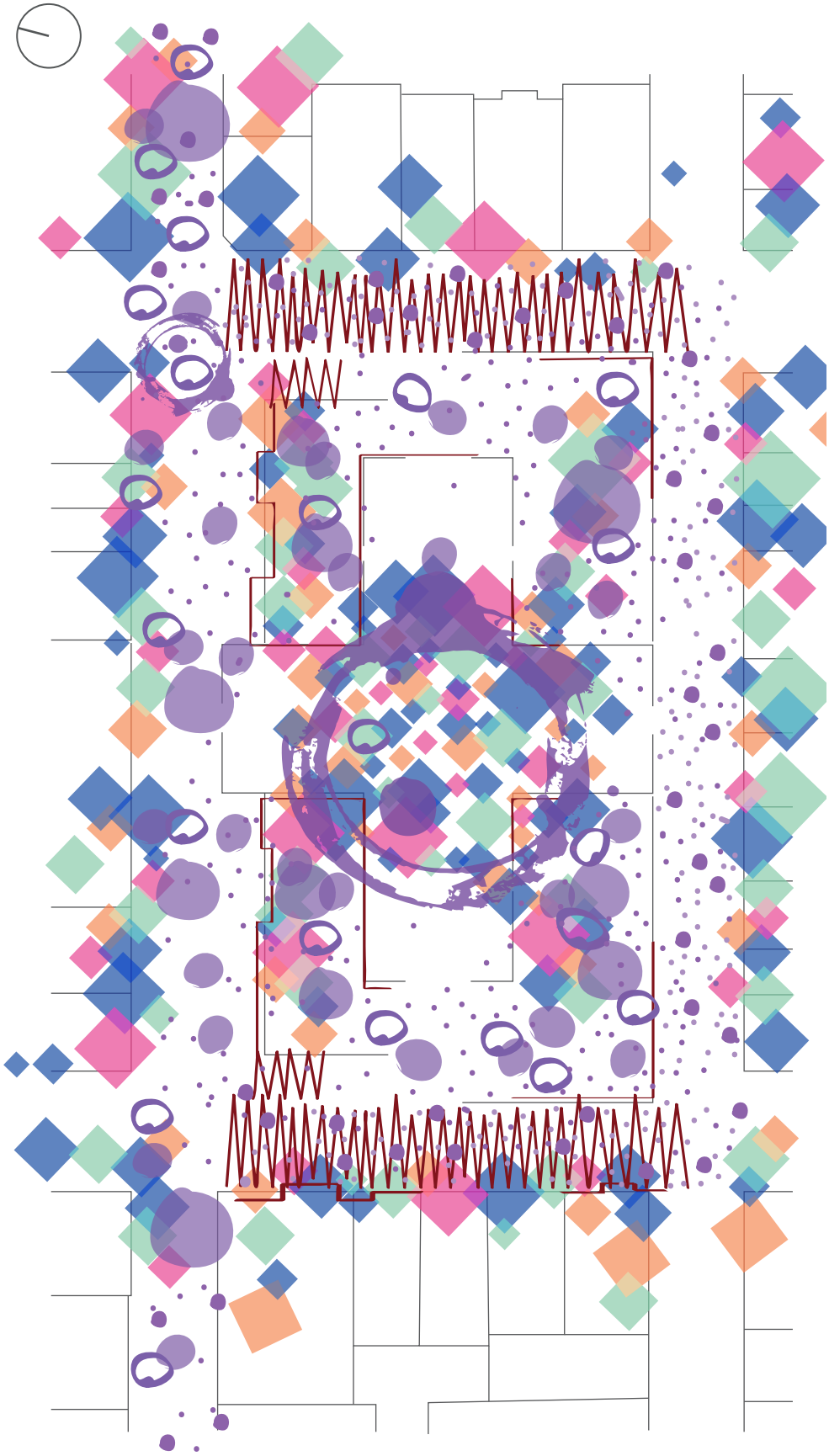


Figure 94. Proposal permeability in the public space

In the result of the proposal map (figure 93-94) the permeability of the area increases noticeably in the market area, in the streets around it and along the Carrer de Calaf which becomes a physically permeable space for pedestrians. Instead of having isolated public spaces (Turó and Moragas Park), the growth of the permeability in the market block and in the Carrer de Calaf make the role of the link between the parks adding more strenght to the public space since it becomes a public space network. The Galvany's market block becomes part of the urban tissue when the porosity increases because is accesible even though the market is closed. Also the increase of viscosity and pressure leads to the creation of more interesting spaces with more uses compared to the continous existing area. As the permeability expands, the pedestrian flow does it as well because of the increase of the activites and the area could become more alive at different hours of the day and not only when the market is open (figure 95).

Figure 95. Permeability in the public space.

Finally, while researching about urban permeability a project has been developed in order to understand the concepts and materialize them as part of the process. The drawings of the public space that links Galvany Market with Sant Gervasi - Galvany neighborhood are presented in the next pages. As it has been mentioned in the previous sections, the process has been a back and forth between designing and researching using both as tools to complement each other.

In the neighborhood scale floor plan (figure 96), it can be seen the connection between the two parks (Moragas and Turó) through the Carrer de Calaf which as has been shown before it is converted to a pedestrian walkway to improve the public space and create more opportunities for pedestrians.

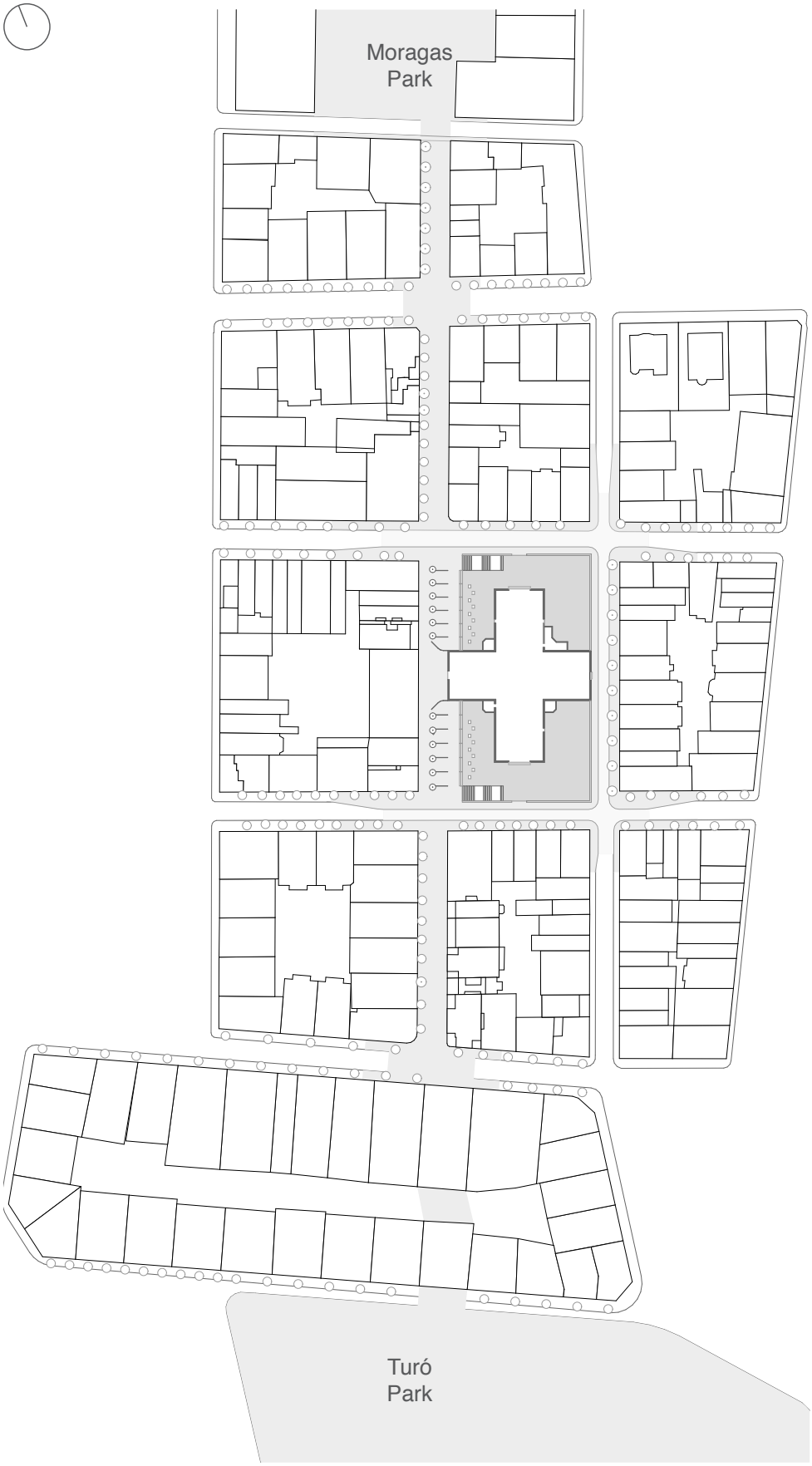


Figure 96. Neighborhood scale: floor plan. scale: 1:2500

The block scale floor plan (figure 97) presents the design of the public space around the Galvany Market, which includes part of the pedestrian walkway in Carrer de Calaf and the shared streets in Carrer d'Amigó, Santaló and dels Madrazo. Also the platform/square created around the market as a open public space which connects it with the urban tissue and is the opportunity for more activities in the area. In the sections (figures 98-103) it can be seen how the topography changes are solved and used to create more viscosity in the project while increasing activities and connections.

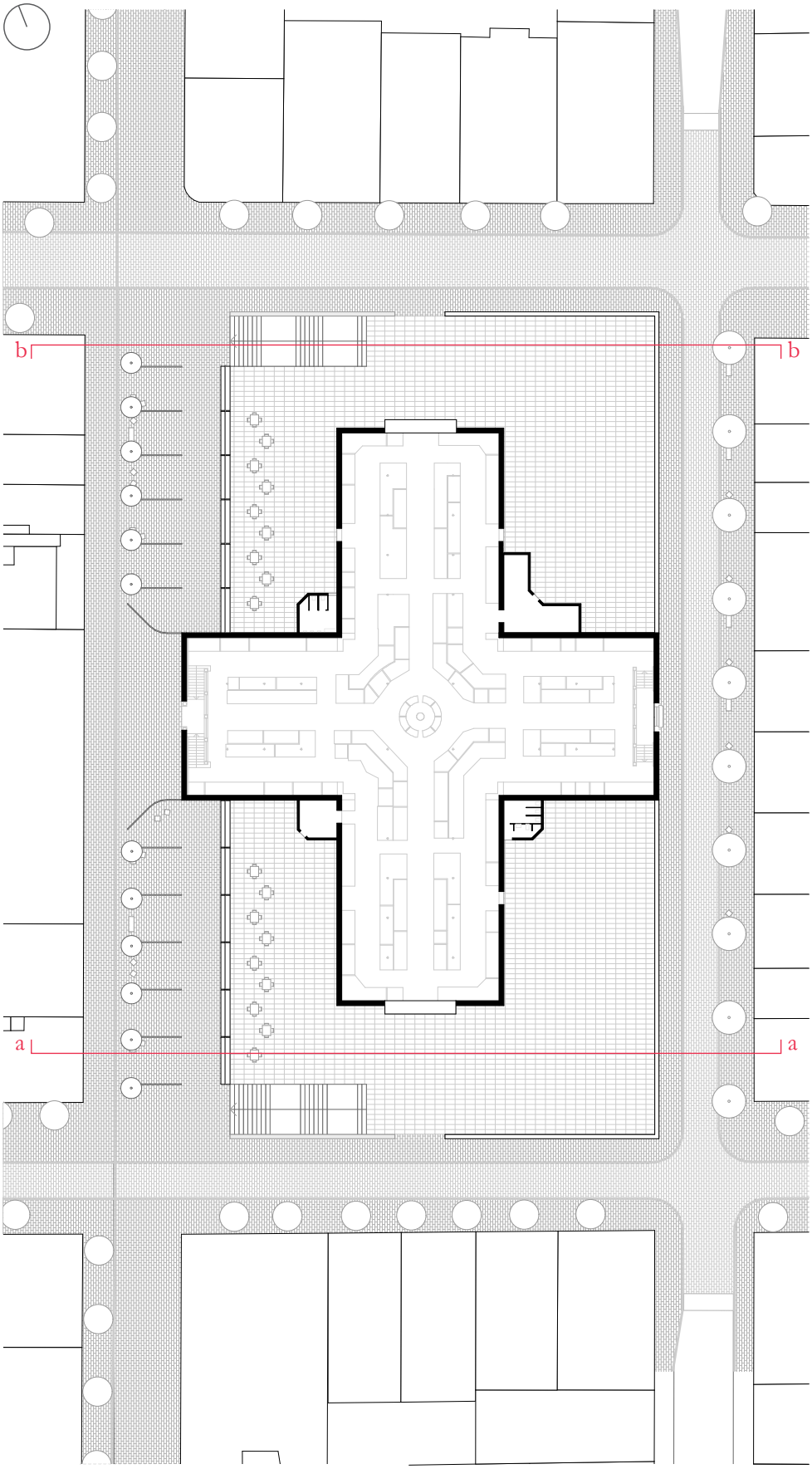


Figure 97. Block scale: public space design in the Galvany's Market block. Scale:1:750.

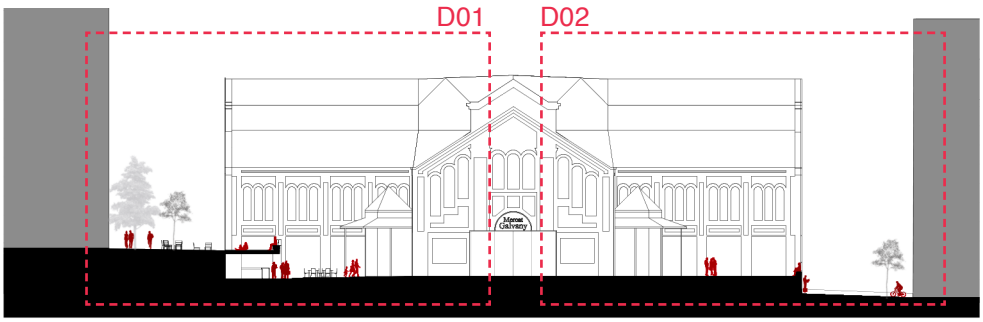


Figure 98. Section a-a. Scale:1:750

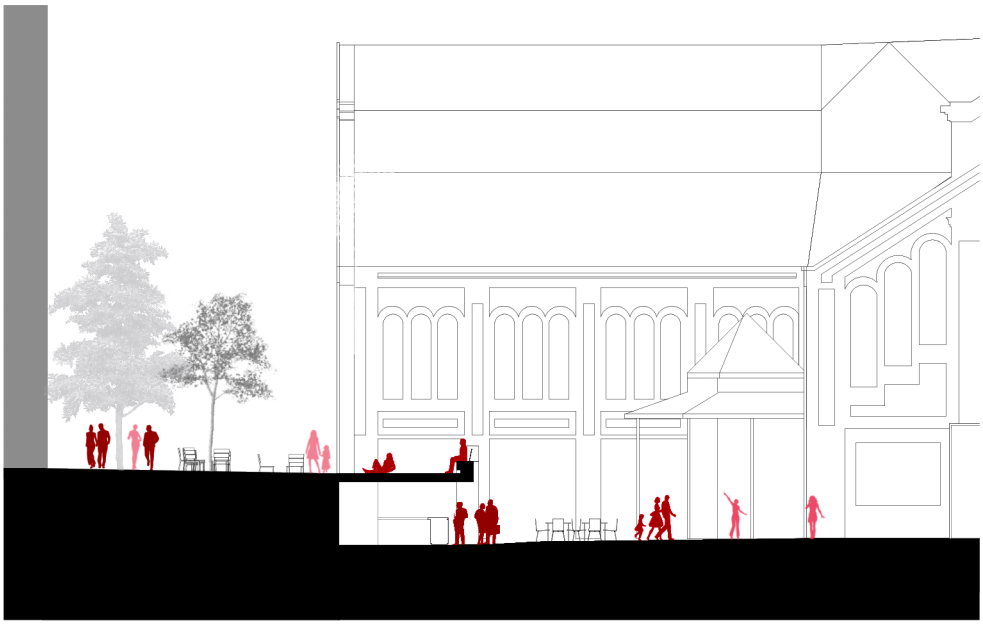


Figure 99. Section D01. Scale:1:300


Figure 100. Section D02. Scale:1:300

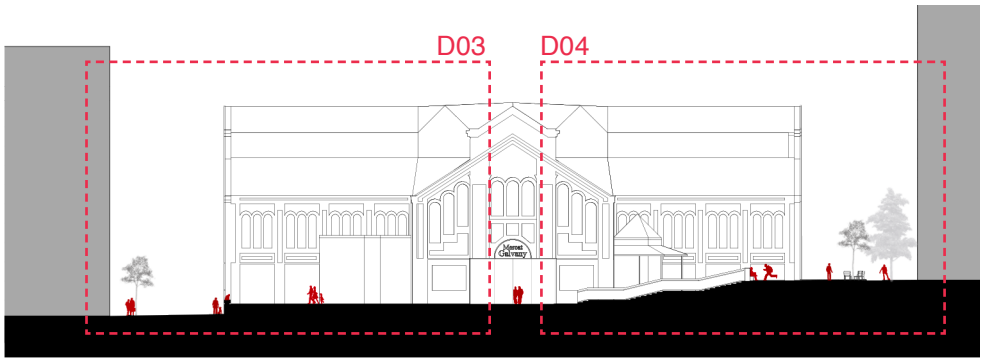


Figure 101. Section b-b. Scale:1:750

Figure 102. Section D03. Scale:1:300

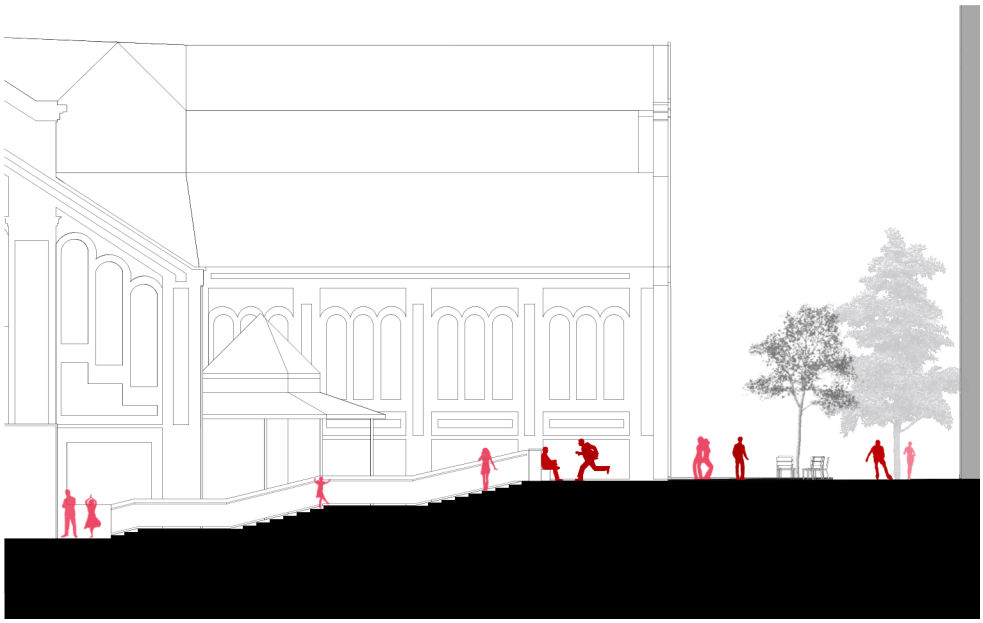


Figure 103. Section D05. Scale:1:300

5. CONCLUSION

In order to develop the final work of the Master Contemporary Project, it was sought an approach related or linked to the main subject of the master, markets. With being Barcelona a vanguard city at urban and architectonic level, its model of markets has a significant impact in the city. The existing markets and their variety in the contexts in which they are immersed is a remarkable phenomenon at city level. The model of the market plan in which the Ajuntamient has worked and continues to do so is a project that integrates people with their neighborhoods and neighborhoods among them, therefore it is a plan that acts at different scales, from human to city scale. Based on the reflection made on the importance of public space and collective space in the city and the markets as catalytic equipment of urban activity it has been able to generate a proposal of architectural design for the public space adjacent to the Galvany Market located in the neighborhood Sant Gervasi - Galvany in Barcelona. The proposal seeks to create cohesion between the equipment (Galvany Market), and the city (Sant Gervasi – Galvany); using the public/collective space as the permeable membrane which allows the adequate passage of pedestrian flow and city activities. The objectives were fulfilled throughout the development of each of the chapters of this work. A conceptual framework was developed on the urban permeability and the public space as a city element in which it was considered the public and collective space concepts and the importance of the treatment given at the ground level and its activities in the city. In addition, as mentioned in the topic of this master's final project, the urban permeability, it was studied as a transition between the building and the city and in the urban fabric, adapting the existing concepts, which include porosity, viscosity and pressure. After this the case study was developed in the project L'illa Diagonal Shopping center, a project of high architectural value and of great importance in the city; integrated in the context, with permeable spaces which facilitate and promote the movement of pedestrians through and inside the project which was an excellent tool to understand the permeability and its effect. As mentioned at the beginning of this section, markets are important facilities in the development of the city, so it was also studied the role they play in the cities, but especially in Barcelona. Then, with the development of the last chapter, information relevant to this work on the Sant Ger-

vasi - Galvany neighborhood was gathered including a briefly study about the neighborhood's and the market history with the purpose of understanding and achieving a better contextualization. The analysis of the intervention area at the urban level was carried out in terms of permeability and a closer approach was taken to the intervention block in which the project has been developed. It can not be said that starting from this the design of the project was developed, because it was a process that was carried out throughout the investigation, it was a joint progression in which it advanced and moved back at the same time that the theory was developed; a process that has been effective since the doubts that the project raised could be solved through the investigation. Finally, after this research/proposal, it is considered that a better integration of the Galvany market has been achieved with the Sarriá-Sant Gervasi neighborhood and with the city of Barcelona. The variety of activities has increased and the possibilities of pedestrian traffic have been enriched; this improves the quality of life of pedestrians and increases the experience in the city which leads to confirm the presented hypothesis of this work: The permeability of the market with the city's urban tissue stimulates social interaction of the inhabitants through the variety of activities. It is important to mention that the project design exercise presents a public space design proposal but this is not the only solution, the idea of this work is to pose a possibility to approach the project; but the same situation can represent another totally different solution with a different approach without ceasing to be valid. It has been sought to find concepts that can contribute to the design and architecture of the city and that can be useful in future projects with different contexts, taking into account that urban permeability should and can be applied at different levels and in diverse types of projects and cities.

The work completed generates unresolved opportunities that were not within the scope of the project but are of great validity and importance. Among these is the renovation of the Galvany Market; the application of the concepts developed in this work on permeability in another context with a different program. These projects can be a contribution to the academic debate on contemporary project, public space and architecture at different scales.

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